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Table of Contents.

An Address.[1]

By S. V. SEWELL,
President, Royal Australasian College of Physicians.

I PROPOSE to try to put before you tonight, from a physician's point of view, some impressions of the men who have made the Melbourne medical school great.

My choice of subject may seem rather parochial when I have the privilege of addressing you as President of an inter-Dominion body. In extenuation I would point out that the Melbourne school of medicine was established just twenty years before any other medical school in Australasia. A further reason lies in the fact that this school had as its first director Professor Halford, a man whose high ideals of medical education have indirectly set the standard for all Australian medical schools.

When it was decided, in 1862, to found a medical school in Melbourne, the advice was asked of no less a person than the great Sir James Paget. He took the view that it would be wise to begin along the lines of the British licensing bodies and so to establish a good technical school with a curriculum of three or four years; but it so happened that Halford was, in addition to being a practitioner, an anatomist, a physiologist and a pathologist, a biologist of high standing. He took the logical view, therefore, that medicine was a department of biology, and urged upon the council of the university the advisability of striking out in a new direction and of establishing a five-year curriculum, two and a half years of which were to be spent in study of the basic sciences of physics, chemistry, botany, comparative anatomy, physiology and human

[1] Delivered at the Annual Ceremony of the Royal Australasian College of Physicians on April 5, 1940.

anatomy, and two and a half years in clinical hospital work. He urged also that the study of physiology should continue throughout the fourth year, when the student was becoming familiar with pathology and the clinical application of his scientific knowledge. Professor Halford's forceful and cogent arguments won the day, and a five-year curriculum was adopted. No such course existed in England till 1894. It was fortunate, for once, that we were isolated by long distances from other medical schools, and therefore it was not easy for short-sighted students to flee from the extra impost to other schools twelve thousand miles away.

It is not too much to say that this momentous decision and the early influence of Halford have been largely responsible for the great record of the Australian medical schools since the other schools, formed in later years, adopted a plan and principles for which he had fought. Since that time the Melbourne curriculum and that of the other schools have been lengthened to six years, three years devoted to biology and the basic sciences, and three years to clinical work. Alas! we have departed from the precepts and practice of Halford in one very important particular, in that there is no overlap between the two divisions of the curriculum, and physiology is no longer studied in the fourth year, when the student is being initiated into clinical work and pathology and thus observing physiological processes gone wrong. I have long urged the righting of this rather fundamental defect, and am still confident that we shall go back to the original principles enunciated by Halford. It is of good augury that Professor Wright is this year introducing his students to the application of physiological principles to clinical problems in the hospital wards.

One of the few privileges of maturity is retrospect, and I propose to give you my own impressions of the men who have continued Halford's great work and made this school respected throughout the medical world here and abroad. Time will not permit me to deal with men like Professor Osborne, who have given such distinguished service, who followed my teachers and did outstanding work in the school.

When I began my medical course forty years ago, this university was extremely fortunate in having three remarkable men in charge of the first-year teaching. I refer to Professors Masson, Spencer and Lyle. I doubt if any medical school in the world was ever served at the one time by three such brilliant men of such outstanding personality. Masson stands preeminent in my experience as a lecturer. His lectures were simply fascinating; couched as they were in beautiful English, his discourses were so lucid and logical that one never took down more than his headings during the lecture, preferring rather to listen, absorbed in his presentation of the subject. So convincing were his arguments that it was an easy matter to write up one's notes at night. To these qualities as a lecturer were added such personal charm, courtly kindness and approachable friendliness that he earned the affectionate regard of all his students.

Not long before he died I was dining with him one night and mentioned the fact that such was our faith in him and acceptance of all he said that had he told us black was white we should have instinctively doubted our own eyes. "Yes", he said, "such blind faith in one's students is very gratifying, but it has its disadvantages", and told me the following story.

> Some years ago I was reading the excellent paper of a man now a distinguished member of your profession, and, at the end of an almost brilliant discussion of colloids, I read this startling statement that, in nature, perhaps one of the best instances of a colloidal solution was a substance called "bilk". I was more than puzzled and even went to the length of looking up a dictionary, but, naturally, got no help. It was only some time later that I remembered having had a bad cold in my head when I delivered the lecture on colloids and that, perforce, my "milk" had become "bilk".

Masson's sense of humour was delightful and whimsical, and seldom did he tell the same story twice.

Spencer was also a great lecturer and he made zoology a very living thing. As a true biologist he taught his subject from a physiological point of view, so that his teaching of biology and comparative anatomy was a splendid introduction to human physiology and anatomy. Spencer was a man of catholic tastes and broad culture, whose influence was felt throughout this university and right through the community.

Lyle had, in natural philosophy, what was for most of us a less interesting subject on which to lecture. Moreover, he lectured from 12 o'clock to 1 o'clock, when most of us were a little brain-weary and more than a little hungry. His lectures were always interesting, but perhaps not quite so brilliant and lucid as those of Masson and Spencer; but as a coach he was preeminent. I shall never forget going to see him just after lunch one day at the end of the first term. I told him that, not having done any physics before, I was rather in a fog over my mechanics. He took me into his room and, in the most kindly way, asked me my difficulties. After nearly three hours he looked at his watch and said: "You wretch, it is nearly five o'clock." I thanked him fervently and escaped; but my difficulties had been so smoothed out that I had little trouble with the subject for the rest of the year. I consider this the best piece of coaching I ever received. Lyle's lectures were frequently illuminated by humorous sallies, not seldom unconscious Irish bulls. For instance, one day, irritated by a number of late arrivals, he said: "The next student who comes in late will be locked out." When the class applauded, Lyle was momentarily angry, and then, appreciating the joke, himself joined in the laugh. With every new class of students Lyle always started "one up", since it was known that he was the man who played the second half of an international rugger match with a broken sternum and more than held his opponent.

Very naturally these three brilliant men were all elected to Fellowships of the Royal Society of England, and, as you know, in each case His Majesty conferred a knighthood.

With this background of teaching in methods of scientific approach, we transferred in our second year to the medical school proper and came under the influence of Charles Martin, Professor of Physiology, a young Englishman, who had come to us from Sydney, where he had been first assistant to Professor Anderson Stuart in the physiology department. Martin was an interesting and stimulating teacher who always told us of the newer work, not in the stereotyped text-books, and gave us often what he termed his own half-baked views concerning the subject he was presenting; but it was to those of us who were in his practical classes, as honour students, that he gave of his very best. Later, Martin's industry, originality, fearlessness and sense of proportion gained him a world-wide reputation as a great medical scientist in the fullest sense.

My third year was easily the most wonderful year of my medical life, a veritable voyage of strange and wonderful adventure, working with Martin in the physiology laboratory and with Stawell at the Melbourne Hospital in the out-patient department. Both of these men were great Socratic teachers and insisted on looking at disease entities in the light of physiological processes gone wrong rather than as collections of symptoms.

Stawell's outstanding work as a teacher at the Children's Hospital was rewarded by a signal and unprecedented honour in 1903, when he was invited to join the out-patient staff of the Melbourne Hospital. I had the joy and the great good fortune, as a third-year student, of being a member of his first class at the Melbourne Hospital. I well remember my first morning in Stawell's clinic. I picture him now, a tall alert young man with clear-cut delightful enunciation of well-chosen English and a vivid magnetic personality. Stawell was taking a patient's history and writing careful notes—a thing unknown in out-patient clinics at that time. I remarked on this, as I thought, very quietly to a fellow student. Stawell immediately turned and fixed me with a none too friendly eye and inquired if I had come to work or to talk; if the latter, then I had better go elsewhere. I apologized and was then told to take the patient into the examination room and investigate the condition of his heart and lungs. My maiden effort was a complete and abysmal failure, as I quickly learnt when about a quarter of an hour later my new teacher came into the room and began to question me and quietly reduced me to a suicidal state. However, there was some grain of comfort when, at the end of my period of torture, he indicated that there was possibly some hope for me, as I did seem to know some physiology. For the remainder of the year the combination of work in the physiology department with Professor Martin and its application with Stawell at the Melbourne Hospital gradually became a pure delight, and by the end of the year, I had become Stawell's slave for all time.

Since those times, over thirty years ago, I have had the opportunity of meeting and hearing many of the world's greatest teachers and, without hesitation, I place Stawell first. His fundamental knowledge, his clear incisive thinking, his power of logical deduction and his magnetic personality when applied to the Socratic method which he adopted, made our mornings dramatic; the atmosphere was electric and things never stood still. He expected a lot, and students worth their salt always gave him of their best. To the slacker he was a holy terror and his sarcasm was biting; but to the earnest student who was a trier, even if dull, he was always kindly and prepared to repeat and repeat again. Occasionally, in momentary exasperation, he would say: "You idiot", and immediately mitigate the insult with his delightful disarming smile.

At the end of my third year I had the opportunity of seeing another side of Stawell, when he honoured me by an invitation ot join him on a fishing expedition to the Delatite. No man was ever a more delightful holiday companion, Puck-like, full of quaint quips, prepared to fool at the proper time, and with a very real appreciation of Nature. Last, but not least, he was an excellent cook, and I have tasted nothing better than a fresh trout cooked by Stawell in the embers of a camp fire. As much care was devoted to teaching me how to cast a fly as to the eliciting and interpretation of physical signs. After much preliminary casting on the green sward, I was allowed to enter the river where a sizable fish was seen to be rising. I miscalculated the depth of the pool and stumbled on entering the water, to be greeted on righting myself by an angry voice: "Idiot, do you think you will catch fish if you enter the pool like an elderly cow?" In spite of such incidents, that holiday was one of the most delightful experiences of my life, and as I speak, every happening is fresh and sweet in my mind.

Another sport into which I was initiated the following year was canoeing. One of Stawell's greatest joys was to send the canoe up to Warrandyte by road when the Yarra was in flood, and we would have the exciting and exhilarating experience of coming down to Studley Park over rushing rapids and slight falls with Stawell at the helm. Many a ducking we had, and we arrived back at Spring Street bedraggled and tired, but happy. Stawell was seldom at a loss for the proper answer, and on one of our trips we were staying at Warburton when a large lady arrived with a diminutive husband obviously very well in hand. At every meal the husband was well trounced by his better seven-eighths, and finally made the dreadful mistake of offering her some salad. She replied in a thunderous voice: "Charles, you know my doctor says that my delicate digestion cannot tolerate salad." She then turned to Stawell and said: "You are Dr. Stawell,

I understand", and proceeded to relate many symptoms. Stawell replied very quietly: "Madam, I knew you enjoyed bad health from the moment I saw you." This induced me to commit a sad indiscretion as I was in the act of drinking tea. I was forced to leave the table in disgrace.

As the years passed, Stawell's influence became increasingly wider, and he remained the idol of men who had been his students, so that his practice became enormous, and at times the burden of letter-writing to patients and doctors alike became almost unbearable. He paid the penalty of a great teacher by having a huge clientele of doctors' relatives and nurses to attend, and at the end of an extremely busy day of medical problems would often find that there had been practically no paying patients. This service he gave ungrudgingly and with real pleasure.

The day I was appointed to the honorary staff of the Melbourne Hospital I lunched with Stawell, and, when I was leaving, he said: "This is a serious job you have undertaken and I want you to promise that you will never allow the earning of a fee for private work to interfere with a teaching day at the hospital unless it be for a distant country consultation." I gave the promise and carried it out. I should like to hand on this advice from Stawell to young men who have now undertaken this important work.

The greatest of our Australian physicians is gone, but his influence lives on, and it is for us, the pupils of a beloved teacher, to do our best to maintain worthily the high standard he has set us. Had he lived, he would without doubt have been the unanimous selection of Australasian physicians for first president of this college.

During my third year Martin was working at the problem of blood pressure in man and devising a means for its accurate clinical measurement. As an early step he devised a huge water manometer, which he mounted on the wall of his own laboratory. He asked us one day to bring some patients with high and low blood pressure up from the hospital. I enlisted Stawell's aid and we went through all the patients attending his clinic that morning and finally picked a plethoric wharf labourer, whose main symptoms were due to imbibing incredible quantities of beer and who had rather a bounding pulse, as a typical high blood pressure case, and a pale thin woman with small blood vessels and rather a small pulse as a low blood pressure case. These we took up to the physiology school in a growler and proudly produced. To our intense consternation the plethoric individual had a perfectly normal blood pressure, while that of the small thin woman was abnormally high, being well over the 200 mark. To Martin's rather scathing criticism of our clinical observation, Stawell quietly remarked: "Yes, it is rather shocking, but why make a song about it? You have got what you asked for: a high and a low blood pressure case."

Soon after this Martin made a compact mercury manometer similar to those with which you are all familiar, and handed it over to us to take a large series of observations. This was the first reliable instrument for this purpose used in any part of the world, and, thanks to Martin, for some years Australia led the world in its knowledge of blood pressure work. Martin's genius for experimental work was thoroughly tested during his term as professor in this university. Unfortunately, departmental grants had been cut to the bone because of the university's financial difficulties following on the Dickson frauds. However, he was an expert glass blower and a mechanic of no mean order, who delighted in acting as the plumber's assistant and often teacher when something went wrong with the departmental plumbing arrangements. As a result of these accomplishments Martin was able to produce the most complicated and accurately calibrated experimental apparatus out of a few kerosene tins and some pieces of glass tubing. This same genius served him well in Egypt during the last war, when he made light of all difficulties and did brilliant work.

In our fourth year we had the privilege of being taught by Professor Allen. Perhaps the work and influence of Sir Harry Brookes Allen in the school have not been as fully recognized as they should have been. He was trained under Professor Halford at a time when Halford was at his very best. Allen had the highest regard for his senior, and appreciated fully the influence which Halford's biological ideals had upon the development of our school. Not very long after graduation Allen became chief asistant to Halford and soon took over the responsibility of the anatomical and pathological teaching. Later he became professor of both anatomy and pathology. He held the dual positions till 1905, when Professor Berry was appointed to the chair of anatomy, and so Allen was relieved of part of his heavy burden. During all these years Allen spent all his mornings at the Melbourne Hospital, giving the most wonderful and illuminating practical demonstrations of anatomy and pathology. Then in the afternoons he gave set lectures on both subjects at the university—truly a tremendous burden of teaching. In addition, he was Dean of the Faculty of Medicine and a member of the University Council and chairman of a number of royal commissions. All these duties he discharged with great ability, and I do not think he ever attended a meeting without having thoroughly digested the agenda paper beforehand. The late Sir Harrison Moore told me that he regarded Allen as the best legal mind on the council.

As a student one regarded him as a man of encyclopædic knowledge and a great expository teacher, but as being cold and aloof, and very few students got close to him. However, at the end of 1906, Professor Allen offered me the position of his chief assistant in the pathology department, which I accepted with alacrity, but with certain misgivings. I could not have found a better or more considerate chief, always willing to help in any difficulty and to give me of his time and knowledge

at the slightest suggestion on my part. Later on he developed a thrombosis which kept him in bed for many weeks, and I had perforce to take on his duties. I shall always remember with gratitude my late afternoon visits to him during this time, when we would discuss the happenings of the morning at the hospital and the subjects of my future lectures. I have met no one who knew the literature of his subject as well as Allen, nor anyone who was so familiar with the contents of his own library. Often he would quote something from one of his books and say, for instance: "You will find that particularly well discussed in the fourth or fifth book on the second shelf on the north wall", and I never found him wrong when I went to search for the book.

Later, when I went abroad and saw something of the most skilled pathologists of the Old World, I found no pathologist who, from the point of view of morbid anatomy, was his peer. Both as a teacher and as Dean of the Faculty of Medicine Allen did much to raise the standard of work in this school, and I have nothing but admiration for my old chief. He was rather jealous and failed to deputize enough; but those were small faults in an otherwise truly great man.

At the beginning of my fifth year I had the good fortune to become a clinical clerk to Sir Henry Maudsley, then Dr. Maudsley. Maudsley was trained in London at University College Hospital and as a student was in the same year as Sir Victor Horsley and Sir Frederick Mott, two very distinguished men whom he defeated in the final examinations. Maudsley was senior resident medical officer of University College Hospital, and was regarded as one of London's most promising young physicians. He was not appointed to the first vacancy on the honorary staff that offered, and, fortunately for Australia, he followed his own desire for travel and, against the strong urging of senior physicians in London, he set sail for Australia and settled in Melbourne. When I became one of his students and, later, his resident medical officer at the Royal Melbourne Hospital, Maudsley was in his early forties. He was a physician with great breadth of knowledge of the literature and was a past master in the art of medicine. It was sometimes a little difficult to get him to give an opinion about a doubtful case, because he refused to be dogmatic and had a wonderful faculty for seeing all the sides of a problem. He was a splendid therapeutist and had great influence over his patients. I well remember his saying to me one day: "It is usually comparatively easy to make a diagnosis of the physical ill from which one's patient is suffering, but the diagnosis of the patient who is suffering the ill, is much more difficult in most cases, and on the accuracy of this latter diagnosis will depend your plan of treatment and your chance of getting the patient well." This is a very real truth, and I have endeavoured to teach it to successive generations of students. Maudsley had not specially the gift of tongues, but nevertheless this school and hundreds of his students owe a great deal of their knowledge and wisdom to his broad, sound and painstaking teaching. I, as one of those specially indebted to him, am proud to have this opportunity of expressing my gratitude and indebtedness to this great physician.

I should now like to speak of one who, though not a member of this medical school, has influenced very greatly medical thought and teaching in medical schools throughout the world. I refer to the late Sir James Mackenzie.

When I was working with Sir Victor Horsley in his laboratory one afternoon in the middle of 1908 we were interrupted by the arrival of a tall, thick-set, bearded Scot, greeted by Horsley as James and introduced to me as Dr. Mackenzie. I asked if he was the Dr. Mackenzie of Burnley, who had published, three years before, a book on the pulse. Mackenzie said: "Yes, but you don't mean to say you have read it?" "Yes", I said, "it both made and spoilt a fishing holiday for two people in Australia." I then explained that Dr. Stawell and I had taken the book with us on a fishing expedition and found it so interesting and new in its observation and outlook that we had spent the greater part of two days sitting with our backs to a gum tree, reading it aloud and discussing the ideas it presented instead of being engaged in perfectly good fishing. He laughingly replied that, as a fisherman himself, I had his sympathy, and added: "From my observation, after being five months in London, I am convinced that you are the only man here, except myself, who has read the book." Dr. Mackenzie at this time had plenty of leisure, as he assured me that he made just over two hundred guineas in his first year in London. This was a splendid thing for me, as I was able to see a great deal of him, since he was always eager to teach a willing student, and loved to debate the problems of cardiac physiology and heart disease, which he had made his life study.

About this time he gave his first paper in London at the Royal Society of Medicine, and I acted as the victim on whom he demonstrated his beloved polygraph. He spoke to a gathering of London's leading physicians, who were obviously curious about this man from the provinces. He put before them the results of many years of painstaking observations, and propounded many, at that time, thoroughly unorthodox views. He rather shocked his audience by producing masses of evidence in favour of his view, now generally accepted, that valvular heart disease, unless gross, is of little importance, provided the heart muscle is healthy and thus able to compensate for the extra work imposed by a slight or moderate degree of valve leakage or obstruction. Such a statement obviously caused a mild sensation among the audience. He then went on to show lantern slides of polygraph tracings illustrating some of the simpler types of heart irregularity, and particularly stressed the fact that premature beats were of little importance, and went so far as to say that the presence of such irregularities

should not influence the physician when giving a prognosis. The outlook of any case should be judged almost entirely on the capacity of the heart to do its work and, in his opinion and experience, this type of irregularity did not interfere in any way with the heart efficiency. Men of distinction rose one after another and complimented him on his ingenuity in inventing the polygraph, but disagreed strongly with and were hurt by his brushing aside what they considered well-established views. One distinguished physician finished a weighty condemnation by saying: "I entirely disagree with Dr. Mackenzie when he says that premature beats are of no importance, and must issue a warning, since the last three cases of this type of irregularity I have seen are now all dead." I was sitting next to Mackenzie during the discussion, and he grew more and more restless and rumbled like an active volcano. As the last speaker sat down, he jumped to his feet and fairly trounced his opponents with his wealth of observed facts and caustic Scotch logic, and finished his remarks by saying: "Concerning Dr. —'s remarks about his last three cases with premature beats being all dead, I can only say that the last three cases of mine that died all had bald heads, but they did not die of their bald heads."

As we walked home after this dramatic meeting Mackenzie said: "I am almost hating my polygraph tonight. All those speakers, most of whom are teachers of medicine, admired the gadget, but failed to appreciate the fundamental and revolutionary principles which the study of thousands of its tracings enabled me to place before them." He had the true missionary spirit and was yearning to have his new and truly fundamental ideas of heart disease understood and appreciated, and really loathed the idea of being known and remembered as the inventor of the polygraph.

One of our Fellows, Dr. Gray, of Christchurch, told me a story of his own first interview with Mackenzie, which so well illustrates the attitude of the father of cardiologists, that I repeat it to you.

Mackenzie had retired from his overwhelmingly busy practice in London to work quietly at clinical research at St. Andrews, but he still saw a few private patients each day. After reading Gray's letter of introduction, he asked Gray what he had been doing in England. Gray reported that he had spent many months working with Thomas Lewis, Parkinson and others in London. Mackenzie was silent for a moment and then said: "You ought to know something of heart disease. Will you please examine my heart?" Dr. Gray did so, as he thought, with great care and said: "I find no evidence of disease, sir, and congratulate you on having such a good heart." Mackenzie told him to complete his examination, and patiently waited while Gray reexamined him and again reported that all was well. "Hoots, man", said Mackenzie, "you have entirely overlooked the most important part of any heart examination in that you have failed to ask me any questions that would enable you to form a judgement of my heart's power to respond during effort. As a matter of fact, I can't walk a hundred yards without getting severe heart pain." Gray decided to begin his studies of heart disease over again, and remained in St. Andrews, working with Mackenzie, for a year, and told me he learned more from the wise old man than from all the other teachers put together.

Mackenzie was fully appreciated by the younger men in London, and was appointed to the honorary staff of the London Hospital in charge of the heart department. In some of his later writings he perhaps rather overstated his views in his efforts to convince his contemporaries; but every practising physician and every patient with heart disease owe much to this wise physician, who did such extensive research work while conducting a busy general practice in an industrial centre. He has freed us and our patients from the over-emphasis of the importance of valvular heart disease, and so has literally saved millions throughout the world from lives of unnecessary invalidism.

No appreciation of the men who have made this school in Melbourne a success would be even approximately complete that did not mention the great work of Sir James Barrett. Barrett was for over forty years the honorary lecturer to successive generations of students on the physiology of the special senses, and I well remember the great pleasure his lectures gave me. This remarkable man, with his multitudinous services to the State, has earned the special gratitude of the medical profession by reason of his establishment of the splendid system of bush nursing hospitals, and of the medical school in particular for the forceful and unsparing service he has always given to the Faculty of Medicine.

These are some of my gods; they have fashioned and lit for us a brilliant torch. 'Tis ours but to carry it and see that it is kept burning.

OXYGEN THERAPY.[1]

By R. DOUGLAS WRIGHT,
Department of Physiology, University of Melbourne.

"OXYGEN THERAPY" for the purposes of this discussion is defined as the increasing of the partial pressure of oxygen in respired air beyond that in the surrounding atmosphere for the purpose of alleviating or preventing a noxious condition in the subject. Other channels of administration of oxygen have been employed or suggested; in every case they are so ineffective or lethal that we need not consider them here. In most cases of disease the effect will not be in the nature of removal of

[1] Read at a meeting of the Victorian Branch of the British Medical Association on March 6, 1940.

or damage to the causative agent, but will be the correction of one manifestation only of the disease processes—that is, the defective supply of oxygen to the tissues. Whether an increase of the oxygen in the respired gases will alleviate this defect depends entirely on the mechanism of its causation. The mere correction of this one phase of disease will not necessarily lead to a resolution of the other phenomena or to the recovery of the patient. It does, however, so far as we know, make these results more probable.

One ordinarily thinks of the atmosphere as containing 20% of oxygen. The exchange of oxygen between the alveolar air and the blood, and between the blood and the tissues, is dependent on the partial pressure exerted by the oxygen present, not on its percentage. It is thus possible to have normal respiration with an atmosphere in the alveoli in which the oxygen exerts a pressure of 110 millimetres of mercury, the carbon dioxide exerts a pressure of 40 millimetres of mercury, and water vapour at 47 millimetres of mercury—that is, a barometric pressure of 197 millimetres of mercury, equivalent to a height of 34,000 feet. The percentage of oxygen in the alveolar air would be 56, and this atmosphere would have exactly the same respiratory value as the alveolar air at sea level containing 14·5% of oxygen.

The amount of oxygen which can be carried by 100 cubic centimetres of blood depends on the amount of hæmoglobin present in the red blood corpuscles. The amount carried by the blood per unit of time will depend on the capacity of the heart to circulate the blood and of the respiratory system to deliver the oxygen to the blood. The normal upper limit is four litres of oxygen per minute during severe exercise; during rest, and with a metabolic rate of 2,000 Calories per day, it would be one-quarter of a litre per minute on the average.

From this fact that the oxygen exchange of the lungs may vary by 1,600%, it is evident that there must be a fairly exact regulation of breathing relative to oxygen. In normal atmospheres and subjects this regulation is fortuitous. The respiratory volume exchange per minute is governed by the level of carbon dioxide in the blood stream—that is, by the amount of carbon dioxide for excretion; the respiratory centre is directly affected by this concentration and the level in arterial blood is almost constant. Though the level is very variable from one person to another, one may say that when the barometric pressure falls to approximately 600 millimetres of mercury, or when the alveolar pressure of oxygen is approximately 70 millimetres of mercury, equivalent to almost 90% saturation of the blood with oxygen, oxygen deficiency becomes the main stimulus to respiration. This increased respiratory exchange by oxygen deficiency is due not to direct stimulation of the respiratory centre but to reflex stimulation through the aortic and carotid bodies.[1] The centre appears to be vulnerable to oxygen defect, not excitable.

The effect of this hyperpnœa has a reverse effect on the alveolar carbon dioxide tension to that of carbon dioxide hyperpnœa on the oxygen tension; it leads to a washing-out of this substance and consequently to a less than normally responsive respiratory centre. In oxygen lack one is thus confronted with the problem that though increasing deficiency leads to increased stimulation of the chemoreceptors in the juxtavascular bodies, it leads also to decreased ability of the respiratory centre to cause the requisite increase in respiration.

The nature of the hyperpnœa is also different from that in carbon dioxide excess. The essential change is increase in rate without a corresponding increase in depth, so that the total exchange is increased only a fraction of that possible with carbon dioxide excess. Rapid shallow breathing, certainly if it is periodic, must always lead to the suspicion of anoxæmia.

It is worth recalling also that for a given degree of saturation of the blood with oxygen the amount of oxygen readily available to the tissues is not always the same. A low carbon dioxide content of the blood, the presence of carbon monoxide, a lowered temperature, each renders the oxygen less readily available by shifting to the left the equilibrium pictured in oxygen dissociation curves. It has even been suggested that some of the symptoms of forced voluntary hyperpnœa are due to anoxæmia of this type.

The above considerations apply to the exchanges of these two closely linked gases. The amount of these substances in the body at any given moment can be calculated approximately. Oxygen is present in simple solution to the extent of 0·3 cubic centimetre per 100 cubic centimetres of blood, and one presumes throughout the *milieu interne*—that is, the extracellular fluid in the areolar tissue and vascular spaces, which has been estimated by Gregersen[3] at 30% of the body weight in dogs. In combination with hæmoglobin it reaches a concentration of 20 cubic centimetres per 100 cubic centimetres of blood. In a person weighing 65 kilograms, if it is allowed that there are about 400 cubic centimetres of oxygen in the alveolar air, there is a total of about 1,450 cubic centimetres of oxygen in the body; that is to say, if all supplies are cut off there is enough for five minutes at low resting metabolism. In the case of carbon dioxide, when 5% is in the alveolar air and 50 cubic centimetres per 100 cubic centimetres (as bicarbonate) are in the *milieu interne*, there is the equivalent of 12 litres of carbon dioxide. Thus the burning of the whole of the oxygen in a strangled person would cause, with a respiratory quotient of 1, a rise of the carbon dioxide level to 56 cubic centimetres per 100 cubic centimetres—a figure not infrequently attained in moderate exercise. It is thus evident that anoxæmia in such conditions is likely to be a very much more serious matter than the rise of carbon dioxide concentration. The opposite condition of over-breathing causes but the faintest increase of oxygen reserve

in the body; but in the case of carbon dioxide it can lead to such a lowering of its concentration that apnœa follows; if the respiratory centre is depressed by an anæsthetic administered during this hyperpnœa, the subsequent anoxæmia may be insufficient to cause a return of respiration. Without adequate supplies of oxygen it is obvious that the level of carbon dioxide cannot be built up again.

The Effects of Anoxæmia.

The mental symptoms may, in acute cases, be absent until loss of consciousness occurs. In less sudden onset there are loss of memory, error of judgement, incoordination, sometimes euphoria, confusion and finally coma. An increasing anæsthesia may be evident. Headache is frequent, and vertigo may occur. Nausea and vomiting are regular symptoms. Dyspnœa and the urgent necessity to breathe are always evident.

A rising pulse rate and blood pressure in the early stages of anoxæmia are followed by circulatory collapse and a slow pulse rate; but this rarely precedes loss of consciousness.[4][5] When anoxæmia continues, heart block develops.[4][6][7][8] Though Whitney[9] found by percussion, evidence of cardiac dilatation, this was not confirmed by Le Wald and Turrell[10] with the use of most precise radiographic techniques. The vulnerability of the heart to anoxæmia is emphasized by the experimental studies of Katz and Long[11] and by Bogue *et alii*.[12] In the latter case the gross aggravation by adrenaline of the effects of anoxæmia is emphasized.

The mere relief of the anoxæmia does not lead to immediate recovery unless the exposure has been short. Permanent mental subnormality, coma or paralyses may be the consequence; cardiac insufficiency of considerable duration, renal damage and peripheral neuritis have all been noted. "Anoxæmia does not only stop the machine, it wrecks the machinery." (Haldane.) Of importance also is acclimatization to anoxæmia, when this is sufficiently prolonged and grave to elicit the response. Gradually a considerable compensation and relative comfort are attained by changes in the circulation, with an increase in the number of red cells and in the amount of hæmoglobin per unit volume, by an increase in blood volume and a resetting of the respiratory centre for the new carbon dioxide pressure.

The Diagnosis of Anoxæmia.

There is only one certain foundation for the diagnosis of anoxæmia: a reliable estimation of the oxygen content and of the oxygen capacity of the arterial blood of the patient. Cyanosis may or may not be present in true anoxæmia, and not in all cases in which cyanosis is present is this sign due to anoxæmia. The presence of cyanosis in true cases of anoxæmia depends on the state of the vessels of the skin. In cases of circulatory collapse or anæmia it may fail to become evident. Constriction of the vessels of the skin for other reasons will also mask it. In carbon monoxide poisoning cyanosis is not seen; rather the skin is more pink than usual. In acarbæmia due to hyperpnœa the failure of normal dissociation due to the low pressure of carbon dioxide in the blood leaves the skin a pink colour. This occurs particularly in anoxæmia due to lowered atmospheric pressure. On the other side cyanosis may be present in conditions of exposure of the skin to abnormal temperature, even though no true arterial anoxæmia is present. Methæmoglobinæmia may also give the impression of cyanosis. However, if the possibility of circulatory conditions as prime factors is kept in mind, cyanosis, especially of the tongue, can usually be taken as indicative of anoxæmia. Another sign indicative of anoxæmia is rapid shallow breathing. Except in those cases in which this has its origin in mental abnormality or irritation of the airways, it is indicative of anoxæmia.[2]

The Ætiology of Anoxæmia, and Oxygen Therapy.

Anoxæmia may arise at normal atmospheric pressures when the partial pressure of oxygen in the alveolar air is sufficiently lowered by dilution of the respired gases with inert gases, such as nitrogen, nitrous oxide, ethylene, methane or, more rarely, hydrogen or helium. At high altitudes the partial pressure of oxygen is reduced because of the low barometric pressures.

Anoxæmia may develop because of a variety of disease processes in the respiratory tract. Obstruction of the airways, as in compression or asthma, compression of the lungs by pleural effusion or intestinal distension or the recumbent position in cases of respiratory disease, may each lead to insufficient ventilation. The interposition of fluid between the alveolar membrane and the atmosphere in the respiratory channels may result from circulatory conditions or irritant gases; by delaying diffusion processes it allows the blood to leave the lungs imperfectly oxygenated.

All these conditions can obviously be improved by increasing the partial pressure of oxygen in the respired gas. In the case of pulmonary œdema a positive pressure insufflation is desirable. When obstructive states are the ætiological background, it is as important to reduce the viscosity of the atmosphere breathed as to increase the oxygen content of it. This is done by substituting hydrogen or helium for the nitrogen of the respired gases.[13]

Deficient aeration of the blood may result from injury to or from abnormal stimulation of the respiratory centre. The commonest mechanisms causing injury to the respiratory centres are anæsthetic agents, anoxæmia and cerebral injuries. In the first case the failure of respiration due to overdosage is well recognized. Yandell Henderson[14] has pointed out another mechanism of injury which occurs during induction and arises because of excitement of the patient. Hyperpnœa occurs with the absorption of a certain amount of anæsthetic and the blowing off of more than a usual amount of carbon dioxide. This removes the normal stimulant of the respiratory centre, and much-reduced respira-

tion or apnœa is the result. In the state of reduced sensitivity of the respiratory centre (due to the anæsthetic and low carbon dioxide content) the anoxæmia resulting from the apnœa may fail to elicit a response. Increasing anoxæmia, together with the continuing anæsthetic concentration, may finally lead to complete failure of the respiratory centre. Henderson holds that this form of danger will not arise if the carbon dioxide concentration is artificially maintained during induction.

In *asphyxia neonatorum* there is profound anoxæmia without raised carbon dioxide concentration of the blood. The respiratory centre is paralysed by the anoxæmia. The best way of administering oxygen after clearing the airways is by means of a respirator of the Drinker type; otherwise one of the mask methods referred to later may be used.

In head injuries failure of respiration usually precedes circulatory failure, and is accompanied at first by rising blood pressure. Its continuance leads, of course, to circulatory failure.

Abnormal stimulation of the centre may arise from irritation of the bronchi, and eventually the abnormal breathing may persist because of "neurosis". Irritant war gases give rise to rapid shallow breathing, which, as shown by Haldane, Meakins and Priestley,[15] causes anoxæmia, which aggravates the condition. The administration of oxygen is of benefit in this condition. Rapid shallow breathing of hysterical origin may also give rise to anoxæmia, and it appears most likely that the anoxæmia in these cases is due to the low proportion the tidal air bears to the residual air in the lungs.

In lobar pneumonia the actual cause of anoxæmia is not definitely known. By-passing of blood through the solid non-functioning tissue appears to be rare. There are an abnormal rate and depth of breathing, which are attributed by some to abnormal stimuli from the lung upsetting the Hering-Breuer reflex. Pleural pain may also limit inspiration. Fatigue of the respiratory muscles is also a possible factor. An organ which ordinarily moves by almost uniform expansion, with practically no movement relative to the chest wall, is now moved bodily at each respiration and weighs up to three pounds. It has been shown how easily the respiratory system tires when called on to carry out abnormal amounts of work for long periods, especially with concurrent anoxæmia.[16] Whatever may be the cause of anoxæmia in lobar pneumonia, there can be no doubt that it does occur in this disease.[17][19]

There can also be no doubt that this anoxæmia can in most cases be relieved by oxygen therapy.[18][19] Stadie found that when desaturation reached 25% recovery did not occur without oxygen therapy.[18]

In bronchopneumonia, of whatever origin, anoxæmia may also occur. To the factors concerned in lobar pneumonia must be added by-passing of venous blood through imperfectly functioning lung tissue. In laboratory animals there is evidence of the efficacy of oxygen therapy.[19] In emphysema or chronic bronchitis, when the respiratory function is on the wrong side of the borderline between adequacy and inadequacy, oxygen therapy has been found to give temporary relief, and its continued use for three or four hours daily, in the evening, may enable the patient to carry on.

In all respiratory conditions it must be remembered that morphine, by its depressant effect on the medulla, will cause the breathing to appear slower and more restful. It may cause improvement by reducing the washing out of carbon dioxide, but it invariably increases or precipitates anoxæmia. It is probably unsafe to give morphine unless the apparatus for oxygen therapy is available. In bronchopneumonia more than in lobar pneumonia the hyperpnœa and freer expectoration induced by the addition of 2% carbon dioxide to the oxygen are valuable effects.

In other cases the respiratory functions may be quite adequate, but the hæmoglobin in the blood is so altered that the unit volume of the blood will not carry its usual complement; there is a normal pressure of oxygen, but a deficient transport system. In anæmia it may be possible to secure another two cubic centimetres per 100 cubic centimetres of oxygen in the blood by raising the respired oxygen to 100%. With a hæmoglobin concentration of 25% (3·75 grammes of hæmoglobin per 100 cubic centimetres) this means an increase of 100% in the readily available oxygen in the blood, and should be considered when the anæmia is acute or can be remedied within two or three days. In carbon monoxide poisoning the anoxæmia is due to the formation of carboxyhæmoglobin and a shifting of the dissociation curve to the left. The decomposition of carboxyhæmoglobin takes place readily in normal atmospheres, but is accelerated by increased concentration of oxygen. The impression that it is a very slow process is due to the fact that the results of the anoxæmia take a long time to abate. Here, as in other cases, it is obviously necessary to relieve the anoxæmia as quickly as possible. This can be done by increasing the concentration of oxygen to as high a figure as possible and by adding to it carbon dioxide, the level of which has often been reduced by hyperpnœa. Not only does the carbon dioxide increase the respiration, but it moves the dissociation curve to the right again, so increasing the availability of the oxygen present as hæmoglobin. Though circulatory insufficiency does not ordinarily mean that the arterial oxygen is low in concentration, this may be so.[20]

The flow of blood per unit of tissue per unit of time is in circulatory failure usually insufficient to supply the needs of that tissue in oxygen, and if the circulatory failure is acute it must be remembered that 100% of oxygen in the respired gases increases the amount of oxygen available to the tissues. In cases of coronary occlusion there is a convincing body of evidence of the value of oxygen therapy;[22][23] cardiac asthma and *angina pectoris* have also been relieved. In cases of shock hyperpnœa is not infrequent. This leads to a

lowering of the carbon dioxide content of the blood, and since Henderson[14] has shown that this alone will cause circulatory collapse, it is worth while supplementing the oxygen with carbon dioxide in these cases.

In chronic circulatory failure and in chronic respiratory insufficiency many compensatory conditions are in operation. The administration of oxygen in these cases can bring temporary relief at the expense of retrogression of these compensatory conditions. It would appear that in such chronic afflictions oxygen therapy is best used as a daily supplement. In cases in which actual or impending failure is present full oxygen therapy should be instituted; but if and when it has been effective, the oxygen concentration should be reduced gradually.

As previously mentioned, the uses of oxygen so far outlined have one basic principle: the alleviation of anoxæmia, not the removal of the cause of that state. Fine *et alii*[24] have demonstrated, however, that oxygen can be used to remove the gas used in encephalography and so to relieve or prevent the undesirable post-operative headache. The mechanism is that the gases in the ventricle fairly rapidly equilibrate with the blood gases—that is, contain about 80% of nitrogen. When the pressure of oxygen in the blood is raised this level of nitrogen is reduced and it is replaced by oxygen, which is more readily absorbed, probably because it is used by the local tissues and the resulting carbon dioxide is removed by the blood stream. Haldane's statement implies that the washing out of nitrogen from the body by oxygen preparatory to ascending rapidly to 26,000 feet (which corresponds to a decompression of 3:1) would avoid any danger of caisson disease.

Boothby *et alii*[25] have recently suggested that a similar removal may be effected in cases of gaseous distension of the intestines, and find that there is no danger of oxygen poisoning with a high (90%) concentration of oxygen administered for two days. Their suggestion that high concentrations of oxygen will cause a reduction in the rate of toxin production and in mortality in cases of anaerobic infections is not supported by any evidence from cases. In gas gangrene infection it may possibly alleviate the anæmic manifestations and even perhaps help in the removal of the gas formed. Further than this, one cannot say whether high oxygen pressures will have, in practice, any beneficial effect in anaerobic infections.

Methods of Administration of Oxygen.

Methods of administration of oxygen can be grouped into three main types. One method is to deliver a certain amount of oxygen into the stream of the inspired air. There are methods in which the head and a variable amount of the body are included in a chamber in which the oxygen pressure is higher than in the surrounding atmosphere and the volume of the chamber is relatively large compared with the tidal air. In the other type a more or less closely fitting mask is connected to an oxygen reservoir, of which the volume is about equal to that of the tidal air.

In the first category falls the intranasal method attributed to Stokes.[26] Barach[27] found that by this method the percentage of oxygen may be raised to as high as 30. With bilateral catheters a percentage of 45 may be achieved. Lombard and Nelson's[28] method, in which the gas is delivered into a lightly fitting celluloid mask, gives as high as 60% of oxygen in the alveolar air of normal subjects receiving seven litres of oxygen per minute.

In the second category fall the oxygen chamber, the tent and Haldane's stratosphere dress. Since Barcroft developed the oxygen chamber for treatment of gassed patients, it has been used in several centres. It is, however, costly to instal, limited in accommodation, costly to maintain, limited in the level to which the oxygen can be raised, and dangerously pyrogenic.

The oxygen tent was first designed by Sir Leonard Hill[29] and used in a case of chronic ulcer of the leg. Carbon dioxide absorption was provided for; but Barach[30] first included a cooling apparatus, and Cecil and Plummer[31] replaced the electric fan for circulation by the injector action of the entering oxygen. Yandell Henderson[32] also described a tent designed to give circulation and cooling and removal of water vapour. All these features are necessary in a tent when oxygen therapy is to be prolonged over several days. Testing of the gas concentrations is then also necessary and can be readily carried out by the use of the special apparatus described by Poulton. The head tent, which is most usually used, was first described by Roth.[33]

Haldane's stratosphere dress is an air-tight bag in which the pilot sits or lies. It will withstand a pressure of 130 millimetres of mercury, and has pure oxygen running into it at this pressure and escaping through a pressure valve. Carbon dioxide absorption is catered for. Tests suggest that almost any altitude could be achieved in this dress.

The use of a mask and bag was first described by Haldane.[34] It had a reservoir for collecting the oxygen flowing during expiration and provided for the dilution of the oxygen with normal air. A flow meter was included in the equipment. A somewhat similar but less practicable arrangement was also advocated by Meltzer.[35] No really new principle has been incorporated in any system since Haldane's apparatus was described. It has been said that his apparatus had too high a frictional resistance. That is easily overcome by increasing the effective diameter of the tubes. Haldane did not provide for humidifying the oxygen. The apparatus described by Whitridge Davies and Gilchrist[36] would provide this to a certain extent, and from the point of view of design, appears to be preferable to the Haldane apparatus for hospital work. It is not so economical in the use of oxygen as the apparatus described by Boothby,[37] Lovelace[39] and Bulbulian,[38] for there is no rebreathing; this may

or may not be an advantage. The water-trap principle is, however, scarcely applicable to aviation, and the "B.L.B." apparatus will probably find its most useful application here.

One has now to consider the indications for the use of the various forms of apparatus. In many cases this depends on the availability of the apparatus and the relative cost of the apparatus and oxygen. Obviously in aeronautics the weight of the containers is also important. So in this sphere and in places where oxygen is very expensive the most efficient form of oxygen usage must be employed; this appears to be the "B.L.B." modification of Haldane's apparatus. When very high percentages of oxygen are required, as in encephalography or in the prevention or relief of intestinal distension, this apparatus or Davies's apparatus is the most suitable. For positive pressure administration, as in asthma or pulmonary œdema, the mask is also the most useful apparatus. When, however, there is fatigue of the respiratory apparatus, as in pneumonia and many circulatory conditions, any close covering of the face or increased resistance to respiration is not tolerated. Oxygen given intranasally or by one of the tent appliances will be better tolerated and therefore efficacious in these cases. If there is any danger of vomiting, as in post-anæsthetic conditions, a closely fitting and fixed mask is not desirable. Free expectoration is also somewhat difficult with this apparatus. For these reasons, in ordinary hospital practice the tent will continue to be the most convenient method for the administration of oxygen in all except a few special cases. If the tent apparatus or technical assistance for determining concentrations is inadequate, double nasal catheters are safer, even though not so effective.

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STUDIES ON BLOOD PRESERVATION.

By E. SINGER, M.D.,

From the Baker Institute of Medical Research, Alfred Hospital, Melbourne.

RECENTLY several excellent papers on the question of blood storage for transfusion purposes have appeared. Wood,[1] Vaughan,[2] Macdonald and Stephen[3] have discussed the general aspect of this problem, whilst Bick[4] and Fåhraeus[5] have studied changes in the chemical constituents and red cells respectively.

The influence of sodium thiosulphate on the plasma proteins, on anaphylaxis and on intoxications has been summarized by Kabelik.[6] It occurred to me that the reactions sometimes observed after transfusion of stored blood might be lessened by the addition of sodium thiosulphate to the preserving fluid. In addition to this, experiments were made on the effect of jellifying substances, of storage in the presence of various gases, and of variations in the osmotic pressure of the preserving fluid. Before these procedures are recommended for blood transfusions it is necessary to ascertain whether they deleteriously alter the properties of stored blood, and accordingly the following factors were considered: (i) fragility of red blood corpuscles; (ii) white cell counts, including differential examination; (iii) the refractive index and the viscosity of the plasma; (iv) complement content, normal sheep hæmolysin and, in one case, Wassermann reaction antibodies; (v) non-protein nitrogen content.

In some experiments red cell counts, bactericidal tests against hæmolytic streptococci and amylase activity of the plasma were determined; but as none of those tests gave results applicable to the determination of suitability of different preserving fluids, the findings are not reported.

Methods.

Blood was taken from patients with high blood pressure or polycythæmia and delivered into "Soluvac" blood transfusion bottles fitted with one glass tube ending just below the rubber stopper and the other terminating at the bottom of the bottle. All the glass connexions and test-tubes used were of "Pyrex", and rubber tubing was reduced to a minimum. The glass parts were cleaned in chromic acid and then repeatedly boiled in doubly distilled water. The rubber corks and tubing were also repeatedly boiled in doubly distilled water.

The complete apparatus, containing anticoagulant, was sterilized by autoclaving for one hour at 125° C. When glucose additions were required a 5% glucose solution, containing 0·1 cubic centimetre of N/1 citric acid to each 100 cubic centimetres, was sterilized separately, and immediately before use the required amount was added to the preserving fluid through the same needle that was used for the collection of blood. In all instances the ratio of preserving fluid to blood was 1:2. When different preserving fluids were tested with the same blood sample, or when the same sample had to be tested repeatedly, the blood was collected into the anticoagulant and, after having stood for one hour, was pumped through double muslin filters into large "Pyrex" test-tubes, which, in the former case, contained the solutions that were to be incorporated in the anticoagulant.

For the determination of fragility one drop of blood was added to a series of tubes containing two cubic centimetres of sodium chloride solution, the concentration of which ranged from 0·32% to 0·56%. Quantitative readings were obtained by comparing the hæmolysis present with a series of dilutions made from completely laked blood. These standards were prepared at the time of the test as follows. Five drops of blood were added to 10 cubic centimetres of distilled water. Two cubic centimetres of this solution in a tube of the same size as used for the actual test correspond to 100% hæmolysis. A series of dilutions of the stock solution was then made, so that the last—that is, 0·2 cubic centimetre of laked blood solution *plus* 1·8 cubic centimetres of water—corresponded to 10% hæmolysis.

The refractive index was estimated with the Zeiss dipping refractometer.

Viscosity was determined by means of the Ostwald viscosimeter, five cubic centimetres of centrifuged plasma being used. The time of flow of redistilled water through the viscosimeter was 102 seconds. Readings are given in seconds of flow.

The titre of complement was determined with 0·1 cubic centimetre of a 3% six-times sensitized suspension of sheep cells, whilst that of hæmolysin was ascertained by the addition of 0·1 cubic centimetre of a 3% suspension of sheep cells and the highest non-lytic amount of guinea-pig serum.

Non-protein nitrogen was determined by the micro-Kjeldahl method after deproteinization with 10% trichloracetic acid or, in some experiments, with tungstate. No obvious difference between these two methods could be observed.

Results.

The Influence of Purity of Chemical Reagents on Blood Storage.

The importance of the influence of purity of chemical reagents on blood storage is shown by the following experiments, in which three types of chemicals were used. The results in Table I were obtained with reagents manufactured locally and alleged to be of analytical reagent quality; the same chemicals after recrystallization gave the values shown in Table II. Finally, Table III gives the results with reagents prepared by British Drug Houses. In the initial blood collection 400 cubic centimetres were delivered into 200 cubic centimetres of citrate saline solution, so adjusted that the final concentration of citrate was 0·4%.

The chief effect of variations in chemical purity is, as shown in the above experiments, in respect of the fragility of the red blood cells. No attempt

TABLE I.

Observation.	Values Immediately After Venesection.	Values After One Week's Storage at 4° C.
	Percentage Hæmolysis.	
Fragility of red blood corpuscles:		
0·34% NaCl	100	100
0·36% NaCl	100	100
0·38% NaCl	60	90
0·40% NaCl	40	90
0·42% NaCl	30	80
0·44% NaCl	10	60
0·46% NaCl	0	50
0·48% NaCl	0	40
0·50% NaCl	0	30
0·52% NaCl	0	20
White cells, per cubic millimetre	1,230	580
Complement, minimum hæmolytic dose	1/160	1/80
Hæmolysin, minimum hæmolytic dose	1/40	1/20
Refractive index	54	53
Viscosity	179	171
Non-protein nitrogen	29	34

was made to determine the causative factor, but the fact remains that chemicals of proved purity must be used for blood storage. Other properties of the plasma, such as complement and antibody content, refractive index, viscosity and non-protein nitrogen content, were unaffected.

TABLE II.

Observation.	Values Immediately After Venesection.	Values After One Week's Storage at 4° C.
	Percentage Hæmolysis.	
Fragility of red blood corpuscles:		
0·34% NaCl	100	100
0·36% NaCl	80	100
0·38% NaCl	70	70
0·40% NaCl	40	40
0·42% NaCl	30	40
0·44% NaCl	20	40
0·46% NaCl	0	20
0·48% NaCl	0	20
0·50% NaCl	0	10
0·52% NaCl	0	Trace
White cells, per cubic millimetre	1,000	520
Complement, minimum hæmolytic dose	1/80	1/40
Hæmolysin, minimum hæmolytic dose	1/80	1/20
Refractive index	57	53
Viscosity	164	164
Non-protein nitrogen	28	35

TABLE III.

Observation.	Values Immediately After Venesection.	Values After One Week's Storage at 4° C.
	Percentage Hæmolysis.	
Fragility of red blood corpuscles:		
0·34% NaCl	100	100
0·36% NaCl	80	100
0·38% NaCl	50	50
0·40% NaCl	20	40
0·42% NaCl	10	20
0·44% NaCl	Trace	20
0·46% NaCl	0	20
0·48% NaCl	0	10
0·50% NaCl	0	Trace
0·52% NaCl	0	0
White cells, per cubic millimetre	1,100	610
Complement, minimum hæmolytic dose	1/160	1/80
Hæmolysin, minimum hæmolytic dose	1/40	1/40
Refractive index	53	52
Viscosity	158	158
Non-protein nitrogen	31	36

The Influence of Sodium Thiosulphate and Glucose.

Blood was collected in citrate saline solution, then pumped over into selected amounts of isotonic sodium thiosulphate and glucose solution. The final concentration of citrate in all samples was 0·4%. The following series of test solutions was employed: (i) citrate in saline solution, (ii) citrate in saline solution *plus* 0·25% sodium thiosulphate, (iii) citrate in saline solution *plus* 0·5% sodium thiosulphate, (iv) citrate in saline solution *plus* 0·25% sodium thiosulphate *plus* 0·1 glucose, (v) citrate in saline solution *plus* 0·25% sodium thiosulphate *plus* 0·2% glucose, (vi) citrate in saline solution *plus* 0·25% sodium thiosulphate *plus* 0·5% glucose.

The values obtained immediately after venesection and after one week's storage in the above solutions are shown in Table IV.

The addition of sodium thiosulphate to the preserving fluid has no obvious influence on the properties of the stored blood. The addition of this substance would, therefore, not impair stability and keeping quality. The addition of glucose lessens the tendency of the red cells to become hypersensitive against hypotonic salt solutions, but at the same time favours the rise in non-protein nitrogen and, in a higher concentrations, a fall in complement content.

The Addition of Gelatin to Preserving Fluid.

It is well known from tissue culture experiments that cells need a solid medium to preserve viability. Accordingly, some experiments were performed to test the properties of blood stored in the form of a jelly.

Blood was collected into citrate-saline-glucose solution, then pumped over into gelatin-saline solution of different concentrations, the final concentration of citrate being 0·4% and of glucose 0·1%. The gelatin was freed from calcium salts by the addition of concentrated sodium citrate

TABLE IV.

Observation.	Values Immediately After Venesection.	Values after One Week's Storage.					
		Solution (1).	Solution (2).	Solution (3).	Solution (4).	Solution (5).	Solution (6).
Fragility of red blood corpuscles:	*Percentage Hæmolysis:*						
0·34% NaCl	100	100	100	100	100	100	100
0·36% NaCl	80	100	100	100	100	100	100
0·38% NaCl	50	80	80	60	60	50	50
0·40% NaCl	30	80	80	50	50	30	20
0·42% NaCl	10	50	50	50	30	20	20
0·44% NaCl	10	50	50	30	30	20	20
0·46% NaCl	5	50	50	30	30	20	20
0·48% NaCl	0	30	30	20	20	10	10
0·50% NaCl	0	20	20	20	20	10	10
0·52% NaCl	0	20	20	20	20	10	Trace
White cells, per cubic millimetre	1,620	300	280	320	320	380	390
Complement, minimum hæmolytic dose	1/40	1/20	1/40	1/20	1/20	1/10	1/10
Hæmolysin, minimum hæmolytic dose	1/40	1/20	1/20	1/20	1/20	1/20	1/20
Refractive index	52	52	52	54	53	52	52
Viscosity	172	168	170	170	170	165	165
Non-protein nitrogen	28·3	34	37	36	36	42	55

solution, filtered and adjusted to pH 7·6. Blood was stored for one week in the following preserving fluids: (i) citrate-saline-glucose solution, (ii) citrate-saline-glucose solution *plus* 8% gelatin, (iii) citrate-saline-glucose solution *plus* 4% gelatin, (iv) citrate-saline-glucose solution *plus* 2% gelatin, (v) citrate-saline-glucose solution *plus* 1% gelatin.

The values obtained immediately after venesection and after one week's storage are shown in Table V.

The gel formation during refrigeration has a distinctly favourable influence on the white cells. The usual decrease of about 60% or 70% of the original number is lessened to about 40%. Moreover, the cells remain much more resistant to mechanical influences. From the blood samples which were kept in a liquid state it was impossible to make

TABLE V.

Observation.	Values Immediately After Venesection.	Values after One Week's Storage.				
		P.F.[1] (1)	P.F. (2)	P.F. (3)	P.F. (4)	P.F. (5)
Fragility of red blood corpuscles:	*Percentage Hæmolysis:*					
0·34% NaCl	100	100	100	100	100	100
0·36% NaCl	90	100	100	100	100	100
0·38% NaCl	40	80	60	60	60	60
0·40% NaCl	20	60	40	40	40	40
0·42% NaCl	20	50	30	30	30	30
0·44% NaCl	10	30	20	20	20	20
0·46% NaCl	0	20	10	10	10	10
0·48% NaCl	0	20	10	10	10	10
0·50% NaCl	0	20	10	10	10	10
0·52% NaCl	0	20	10	10	10	10
White cells, per cubic millimetre	1,850	600	800	1,100	1,280	1,100
Complement, minimum hæmolytic dose	1/80	1/40	0	0	0	0
Hæmolysin, minimum hæmolytic dose	1/80	1/40	0	0	0	0
Refractive index	54	51	92	84	72	61
Viscosity	175	172	(Not determined.)			
Non-protein nitrogen	32	38	(Not determined.)			

[1] P.F.=preserving fluid.

satisfactory slides even after three days' storage. In the gelatin preparation the monocytes and lymphocytes were especially well preserved; the polynuclear leucocytes had lost most of their granules, but were still easily recognizable by the characteristic structure of the nucleus.

The same applies to a less degree to the red cells. The increase in fragility is distinctly less, but cannot be prevented. The gelatin has an unfavourable influence on the globulin fraction of the plasma. Complement content and normal sheep hæmolysin are completely destroyed. In addition to the above there is a great increase in viscosity, whilst we must also bear in mind the risk of tetanus. Gelatin cannot therefore be considered as a suitable addition. Attempts were made to replace gelatin by other jellifying substances, such as different kinds of pectins and alginic acids, but these failed to give satisfactory results. There was either no gel formation under conditions necessary for the preservation of blood, or the gel formed could not be liquefied by heating the mixture to 37° C.

The Influence of Storage in Different Atmospheres.

Blood was taken into citrate-saline solution containing 0·1% glucose and pumped over into large "Pyrex" tubes fitted with rubber stoppers, which were perforated by two tubes ending a short distance above the surface of the blood. A gentle stream of the gas to be tested was passed for one hour through the tubes, and the rubber tubings connecting the tubes were then closed with screw clamps and cut off short.

In Table VI are shown the values obtained immediately after venesection and after one week's storage in: (i) air, (ii) carbon dioxide, (iii) "Carbogen", (iv) a vacuum.

Storage of the same blood sample in different atmospheres shows that carbon dioxide has an unfavourable influence. The other methods tried revealed no great differences.

The most important changes occurring in the blood samples which were used for the experiments so far described are, in order of importance: (i) the increase of the sensitivity of the red cells against hypotonic salt solutions and the accompanying decrease in the number of white cells, (ii) the fall in the complement and antibody content of the plasma, (iii) the increase of non-protein nitrogen content, and (iv) the decrease of the refractometric index and viscosity.

Concerning the increase in fragility of the red cells, this was considered most important because it seems very probable that the changes which become apparent by this test lead directly to the final hæmolysis of the red cells, which is the principal cause for the limitations of stored blood for transfusion.

The decreases in complement and antibody content are also important factors, because the increasing of resistance against infection is usually attempted by blood transfusion and, further, those decreases indicate a very early change in the most sensitive part of the plasma proteins.

The Influence of Storage on Antibodies.

It was thought advisable to compare the observed loss in normal antibody with the behaviour of an immune antibody. As no person convalescent after typhoid, brucellosis or some bacterial infection in which the antibody content could be estimated was available, a patient suffering from *lues latens*, whose

TABLE VI.

Observation.	Values Immediately After Venesection.	Values after One Week's Storage.			
		Atmosphere (1)	Atmosphere (2)	Atmosphere (3)	Atmosphere (4)
Fragility of red blood corpuscles:	*Percentage Hæmolysis:*				
0·34% NaCl	100	100	100	100	100
0·36% NaCl	80	100	100	100	100
0·38% NaCl	40	80	80	80	80
0·40% NaCl	20	50	50	50	50
0·42% NaCl	20	40	50	40	40
0·44% NaCl	5	20	30	20	20
0·46% NaCl	0	20	20	20	20
0·48% NaCl	0	20	20	20	20
0·50% NaCl	0	10	20	Trace	Trace
0·52% NaCl	0	Trace	20	0	0
White cells, per cubic millimetre	1,200	500	200	500	500
Complement, minimum hæmolytic dose	1/160	1/80	1/80	1/80	1/80
Hæmolysin, minimum hæmolytic dose	1/80	1/40	1/40	1/40	1/40
Refractive index	50	49	49	49	49
Viscosity	164	162	162	162	162
Non-protein nitrogen	34	38	38	38	38

serum reacted strongly to the Wassermann test, was selected and the titre of the complement-fixing antibodies was determined (see Table VII). All the other tests reported in the previous experiments were performed at the same time, but the results are not given, since nothing unusual was found.

Blood was collected into citrate saline solution and pumped over into "Pyrex" tubes containing the following additions: (i) citrate and saline solution, (ii) citrate and saline solution *plus* 0·1% glucose, (iii) citrate and saline solution *plus* 0·5% glucose, (iv) citrate and saline solution *plus* 0·1% glucose and 0·1% sodium thiosulphate, (v) citrate and saline solution *plus* 0·1% glucose and 0·5% sodium thiosulphate, (vi) citrate and saline solution *plus* 0·5% glucose and 0·5% sodium thiosulphate.

The Wassermann reaction antibodies proved to be a little more resistant to storage than the normal sheep hæmolysin. After three days' storage the titre of sheep hæmolysin had dropped to half the original amount, the titre of the Wassermann reaction antibodies in unheated serum remained at the original height, but the sensitivity of the antibody against inactivation by heating for thirty minutes to 56° C. was increased. After one week's storage the decrease in titre was about the same as the decrease of the normal antibody content.

Glucose favours the decrease in complement content, and the addition of sodium thiosulphate can prevent a further decrease if not more than 0·1% glucose is added.

The Effect of Anticoagulants of Varying Citrate Concentration.

Finally, citrate solutions of less than the usual concentration of 3·8% to 3·5% were used. Experiments were performed with 2·6% and 1·3% citrate solutions mixed with the appropriate amount of normal saline solution, so as to bring the final concentration of sodium citrate in the blood sample to 0·4%. It was found that the use of these more dilute solutions prevented to a certain extent the quick increase in the fragility of the red cells and, because of this delay, the final hæmolysis (see Table VIII). The other changes—drop in the titre of complement, antibody deterioration of white cells *et cetera*—occurred at the usual rate and are therefore not reported.

These results compare favourably with the other experiments, and it is thought that the use of preserving solutions with weaker osmotic pressure should be recommended for practical trial. The first traces of hæmolysis were observed in these samples as a rule between the tenth and the twelfth day. The samples were not stored in a refrigerator by themselves, but in the one used for ordinary laboratory purposes, and were therefore disturbed several times a day. Hæmolysis was delayed to the fourteenth to sixteenth day in the specimens taken into the dilute solutions. If one assumed sodium citrate to be completely ionized in aqueous solution, then a 3·5% concentration would be strongly hypertonic. The results given in Table IX show that the usual solution used is hypertonic.

Comparison of the Fragility of Red Cells in Saline and Sodium Citrate Solutions.

Three cubic centimetres of blood were taken into a few drops of 3·5% citrate solution and immediately put into sodium chloride and sodium citrate solutions of different concentrations for testing the fragility.

Table VII.

Observation.	Immediately After Venesection.	After Three Days' Storage.						After One Week's Storage.					
		Solution (1)	Solution (2)	Solution (3)	Solution (4)	Solution (5)	Solution (6)	Solution (1)	Solution (2)	Solution (3)	Solution (4)	Solution (5)	Solution (6)
Complement, minimum hæmolytic dose ..	1/80	1/40	1/20	1/20	1/40	1/40	1/40	1/40	1/20	1/20	1/40	1/40	1/40
Hæmolysin, minimum hæmolytic dose ..	1/160	1/80	1/80	1/80	1/80	1/80	1/80	1/80	1/80	1/80	1/80	1/80	1/80
Wassermann reaction:													
(a) Serum not inactivated	Positive in a dilution of 1/80	1/80	1/80	1/80	1/80	1/80	1/80	1/20	1/20	1/20	1/20	1/20	1/20
(b) Serum inactivated	Positive in a dilution of 1/80	1/20	1/20	1/20	1/20	1/20	1/20	1/20	1/10	1/10	1/20	1/20	1/20

Table VIII.

Observation.	200 cubic centimetres of Blood taken into 61 cubic centimetres of 2·6% Citrate Solution + 39 cubic centimetres of Normal Saline Solution.			200 cubic centimetres of Blood taken into 100 cubic metres of 1·3% Citrate Solution.		
	Values Immediately After Venesection.	Values After Three Days' Storage.	Values After Eight Days' Storage.	Values After Venesection.	Values After Three Days' Storage.	Values After Eight Days' Storage.
Fragility of red blood corpuscles:	*Percentage Hæmolysis:*					
0·34	100	100	100	100	100	100
0·36	100	100	100	100	100	100
0·38	70	80	80	60	80	80
0·40	40	50	50	40	40	50
0·42	30	30	30	30	30	50
0·44	20	20	20	20	20	30
0·46	0	20	20	10	20	20
0·48	0	Trace	Trace	0	10	20
0·50	0	0	0	0	0	10
0·52	0	0	0	0	0	0

TABLE IX.

Fragility of Two Different Samples of Red Blood Corpuscles.

Sodium Chloride Percentage.	Percentage Hæmolysis.		Sodium Citrate Percentage.	Percentage Hæmolysis.	
	(1)	(2)		(1)	(2)
0·34	100	100	0·35	100	100
0·36	100	100	0·52	100	100
0·38	80	80	0·70	100	100
0·40	40	60	0·81	70	100
0·42	30	60	1·00	50	60
0·44	10	20	1·22	10	10
0·46	Trace	10	1·40	0	0
0·48	0	Trace	1·57	0	0
0·50	0	0	1·75	0	0
0·52	0	0	1·92	0	0
0·54	0	0	2·10	0	0

The testing of the fragility of the red cells in citrate solutions shows a higher resistance against dilute solutions than could be expected if 3·5% or 3·8% solutions were isotonic.

Summary and Conclusions.

In the experiments reported, the properties of human blood taken into different preserving fluids and stored in the refrigerator at 4° C. were studied. The importance of testing different unrelated characteristics of the blood samples is stressed. The most important changes which occur within the first two or three days of storage are the increase of the fragility of the red cells and a loss in antibody and complement content. The loss in antibody content could be demonstrated by testing the content of normal sheep hæmolysin and, in one instance, by quantitative examination of Wassermann reaction antibodies in a case of *lues latens*. All the other changes observed occur at a later date.

Different preserving fluids do not alter the qualitative properties of the stored blood, but can only delay or hasten by a few days the onset of the reported changes. It seems that more dilute solutions, of lower osmotic pressure than is usually employed, would be useful for blood storage, provided that these slightly hypotonic solutions did not affect the recipient.[1] Since only laboratory experiments were performed and no actual transfusions were made with the modified fluids, no final conclusions can be given.

Properties of blood samples taken with precisely similar apparatus and preserving fluid can vary enormously, according to the time taken for the collection of the sample and the ease of flow during collection. It is difficult to test the influence of the actual bleeding procedure in a quantitative way; but stress should be laid on the fact that the qualities of the stored blood are at least as much dependent on the technical details of the collection as they are on the preserving fluid and apparatus.

It is sometimes recommended that the preserving fluid should be sterilized by filtering instead of by autoclaving. In our experiments no disadvantage was observed from sterilization by autoclaving the complete apparatus together with the preserving fluid, glucose solution excepted; this was sterilized separately with a small addition of citric acid. It seems that autoclaving would be the easier and safer method when a partially trained staff only is available, or in an emergency.

[1] Shortly after these experiments were finished, a paper by M. Maizels and N. Whittaker appeared in *The Lancet*, Volume II, 1939, at page 1219. These authors, using different methods, came to the same conclusion, that the citrate solutions usually employed are hypertonic in respect of the red cells of humans.

Acknowledgements.

I desire to thank the medical staff of the Alfred Hospital, especially Dr. R. Officer, Dr. J. A. McLean and Dr. D. J. Oldmeadow, for making available patients for the collection of blood.

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GEORGE BODINGTON AND THE SANATORIUM.

By DOUGLAS ANDERSON, M.D.,
Honorary Assistant Physician, Royal North Shore Hospital of Sydney.

PREPARATIONS are in hand (or were, just before the outbreak of war) for a medical pilgrimage to be made this year to the town of Sutton Coldfield in Warwickshire, to celebrate the centenary of the publication of a little book, "An Essay on the Treatment and Cure of Pulmonary Consumption", by George Bodington. It has been stated by recent writers in THE MEDICAL JOURNAL OF AUSTRALIA that Bodington "opened the first English sanatorium" in 1840 and that this might be termed "the English sanatorium centenary year". Neither of these statements is historically quite accurate. The centenary being celebrated is a much more important one than that of the sanatorium; a sanatorium, after all, is only a place. The centenary is that of Bodington's essay, which was the first published work to enunciate clearly the basic principles, founded upon observation and logic, of the modern treatment of pulmonary tuberculosis.

George Bodington was born in 1799. He was apprenticed to a surgeon at the age of seventeen; later he became a medical student at Saint Bartholomew's Hospital. He qualified in 1825 and went into general practice at Erdington, which was then a village near Birmingham. He was "a diligent reader of the great book of Nature" and a vigorous thinker for himself. "When I began to practice medicine as an art", he wrote, "after

having imbibed the theories of the schools, I very soon found the necessity of laying them aside as a guide, having discovered, as I believed, that the practice founded thereon was useful to a certain extent only, and, as far as that went, fit to be employed; but that it was worse than useless, when employed like a talismanic wand, to unlock and overcome every difficulty that might present itself." His first medical essay, written in 1831, was a strong protest against bleeding and the use of calomel in the treatment of Asiatic cholera, of which a great epidemic was then raging. In 1836 he became the proprietor of "Driffold House" at Sutton Coldfield, which was licensed as a private lunatic asylum for twenty patients, and during the next few years became an advocate of less physical restriction for the insane and wrote condemning the common use of very drastic purgatives in asylum practice. In 1839 he wrote a long letter to *The Lancet* on the treatment of scarlatina, which was very prevalent and malignant in that year. He reported the histories of five patients, some treated by his own methods and some by those of others, and pleaded for the substitution of mild anodynes and stimulants for the drastic depletion and "scouring out" commonly resorted to. Subsequent communications to the same journal showed that the type of treatment advocated by Bodington was followed by others with satisfactory results; indeed, the profession was led to rediscover the teaching of Thomas Sydenham a century and a half earlier:

. . . aeger non raro nulla alia de causa, quam nimia Medici diligentia, ad plures migrat.

In 1840 there came the historic little book on consumption, written, he says in the introduction, when short intervals of time could be snatched from occupations varied and almost incessant. At that time the prevailing treatment of pulmonary tuberculosis was to keep the patient confined in a sealed room for fear of the evil influence of cold air, while iodine or digitalis was administered, blisters, leeches or plasters applied to the chest, or (most commonly) tartarated antimony given in large doses as an expectorant and circulatory depressant; the diet was usually meagre and "antiphlogistic", often consisting largely of vegetables, rice and water. Against these methods Bodington protested. The close-room treatment, he stated, was more deserving of reprobation than even the apathetic indifference and hopelessness generally entertained, while the tartarated antimony materially assisted the disease in destroying the powers of nutrition, the muscular power and the functions of the skin, at the same time increasing the nervous excitement. He wrote:

I come now to the most important remedial agent in the cure of consumption, that of the free use of a pure atmosphere; not the impure air of a close room, or even that of the house generally, but the air out of doors, early in the morning, either by riding or walking; the latter when the patients are able, but generally they are unable to continue sufficiently long in the open air on foot, therefore riding or carriage exercise should be employed for several hours daily, with intervals of walking as much as the strength will allow of, gradually increasing the length of the walk until it can be maintained easily several hours every day. The abode of the patient should be in an airy house in the country; if on an eminence the better. The neighbourhood chosen should be dry and high; the soil, generally of a light loam, a sandy or gravelly bottom; the atmosphere is in such situations comparatively free from fogs and dampness. The patient ought never to be deterred by the state of the weather from exercise in the open air; if wet and rainy, a covered vehicle should be employed, with open windows. The cold is never too severe for the consumptive patient in this climate; the cooler the air which passes into the lungs, the greater will be the benefit the patient will derive. Sharp frosty days in the winter season are most favourable. The application of cold pure air to the interior surface of the lungs is the most powerful sedative that can be applied, and does more to promote the healing and closing of cavities and ulcers of the lungs than any other means that can be employed.

Also he wrote, "not having the fear of 'phlogiston' before my eyes—that 'raw head and bloody bones' of medical science—I have . . . employed a nutritious and moderately stimulating diet with much success". He gave a sedative for cough, and the patient was fortified with a glass of good sherry or madeira with an egg on his return from his excursions. He described the success of this treatment as he had carried it out from 1833 onwards, in some instances "under his own roof", on patients suffering from consumption.

It is not strictly correct to say that Bodington "opened a sanatorium" in 1840, although when the number of his patients increased he took a special house for them near his own residence. This house was still standing a few years ago. The word "sanatorium" in 1840 conveyed a different meaning from that which it conveys today, and was in very ill odour. In the year 1839 Southwood Smith had convened a meeting "to consider the propriety of forming a Self-supporting Establishment, for the reception and cure of sick persons of the middle classes". The institution was to be called a sanatorium. The proposal invoked the wrath of the organized profession, which saw in it "a medical club extended to the higher ranks of life", "a hybrid creation, half hospital, half tavern", "a piratical attempt under the flag of Charity to rob the profession for the benefit of a few", while *The Lancet* shed crocodile tears about the miseries of hospitals compared with domestic medical care. The British Medical Association resolved that "notwithstanding the apparent plausibility of the scheme, it would not be beneficial to the public health or morals; that such schemes were uncongenial to the feelings of Englishmen and altogether foreign to the habits of the nation; and that Sanatoria would deprive members of the profession of their just and natural emoluments by a system of monopoly and centralization". And so, though the projectors fought hard for their sanatorium, they received not much support, the project died and the word left a nasty taste in the medical mouth for a long time.

Bodington's little book met with a cool and even hostile reception. *The Lancet* stated:

. . . we shall merely give an outline of his principles, without expending any portion of our critical wrath on his very crude ideas and unsupported assertions.

However, the reviewer went on to admit that:

More agreeable or seductive medicaments could not, certainly, be found in any pharmacopœia; first morning air to make the patient breathe, good wine to bring down his pulse; a good dinner to make him fat, and an opium pill to make him sleep, are all excellent remedies, if they would only have the desired effect.

and

If . . . Mr. Bodington [has] proved his case . . . [he] is entitled to national rewards equal, nay, superior, to those conferred on the illustrious Jenner.

The ultimate fate of Bodington's patients we do not know; perhaps it was not encouraging, and, like so many sanatorium patients who are "progressing favourably" today, they had only a few years to live. Bodington's little book passed into limbo and it was not until the sixties that his principles of the treatment of consumption came into their own. In 1865 *The British Medical Journal* reviewed the "Essay" and did its author tardy but ample justice.

In 1843 Bodington decided to devote his whole time to the treatment of the insane; at this he prospered, and outside his profession he was a well-known figure in the district, a fluent speaker at public meetings, a magistrate and warden of the borough of Sutton Coldfield. While he did not pursue the treatment of tuberculosis, he continued to hold his opinions, and in 1866 he wrote in a letter to his son: "I often think that when I am dead and buried perhaps the profession will be more disposed to do me some justice than whilst I live." He died in 1882 at the age of eighty-two.

Addendum.

The following is a bibliography of books, pamphlets, articles and letters to periodicals by Bodington and of reviews of his work.

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"Treatment of Cholera by Sulphuric Acid", letter, *The Lancet*, October 1, 1853, page 322.

"The Treatment of Cholera by Sulphuric Acid", letter, *The Lancet*, October 22, 1853, page 400.

"The Acid Treatment of Cholera", letter, *The Lancet*, October 14, 1854, page 320.

"On the Salubrity of Birmingham", report of a paper read to the Epidemiological Society on December 4, 1854, *The Lancet*, December 23, 1854, page 530.

"The Physiological Effects of Opium", letter, *The British Medical Journal*, June 9, 1860, page 445.

"The Plea of Insanity", letter, *The British Medical Journal*, March 12, 1864, page 30.

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(Also about ten other letters published in *The British Medical Journal* between 1862 and 1873.)

"Anæsthetics", letter, *The Lancet*, January 4, 1873, page 32.

Reviews of Bodington on Consumption.

The Lancet, July 11, 1840, page 535.
The Medical Times, August 29, 1840, page 274.
The British and Foreign Medical Review, Volume X, October, 1840, page 549.
The British Medical Journal, October 28, 1865, page 458.
The Lancet, March 3, 1906, page 617.

Biographical Notes and Appreciations of Bodington.

"Obituary: George Bodington", *The British Medical Journal*, February 18, 1882, page 252; *The Lancet*, March 11, 1882, page 417.

"Men and Books. XI: George Bodington", by Sir W. Osler, *The Canadian Medical Association Journal*, Volume II, June, 1912, page 526.

"A Bart's Pioneer", by Sir W. Langdon-Brown, *Saint Bartholomew's Hospital Journal*, Volume XLVI, September, 1939, page 244.

History of Bodington Sanatorium, Wentworth Falls, New South Wales.

"Bodington", by Mary Salmon, *Australasian Pharmaceutical Notes and News*, Volume XIII, June, 1916, page 20.

Reviews.

A HANDBOOK OF PÆDIATRICS.

To write a clear, authoritative and concise guide to pædiatric medicine must always be a task of the greatest difficulty, for the subject matter is extremely wide and varied, and the knowledge of it has much in common with the children of whom it treats—it is a young and growing thing. It is, then, not surprising that Dr. F. M. B. Allen's "Handbook", while bearing many signs of commendable effort, cannot be endorsed as a book of outstanding value.[1] Necessarily, many of the descriptions are very condensed; but it does not seem that they have been kept in just proportion. For instance, pink disease (admittedly an attractive subject) receives one and a half pages and a plate, while all diseases of the liver and pancreas, including *diabetes mellitus*, are dealt with in seven and a half pages.

In a short book intended primarily for students, it is unreasonable to criticize a healthy didactic dogmatism;

[1] "Handbook of Diseases of Infants and Children for Students and Practitioners", by F. M. B. Allen, M.D., F.R.C.P.; Second Edition; 1939. London: Baillière, Tindall and Cox. Demy 8vo, pp. 428, with illustrations. Price: 18s. net.

but it is a matter for regret that this should be found cheek by jowl with conjecture of relatively little potential or suggestive value—two lines of the short chapter on the liver are used to state that cœliac disease may "eventually be determined to be a disease of the liver". A rather similar defect is to be found in some of the advice given concerning treatment; for we read that: "Clinically, 'biliousness', acetonuria, cyclical vomiting, migraine, indigestion associated with pale stools, impaired appetite, deposits of urates in the urine ('white urine') are attributed to disturbance of function of the liver . . . The treatment of these functional disturbances consists in a preliminary dose of calomel followed by a rhubarb and soda mixture. Conditions of acetonæmia, cyclical vomiting, migraine . . . sometimes respond to increased sugar intake." Again, in the discussion on obesity, reference is made to "the judicious use of dried mixed gland preparations".

A more serious defect, from a teacher's viewpoint, lies in the advocacy of transfusion by the fontanelle, and without the aid of any device such as the Kauffmann syringe. This dangerous procedure need hardly ever be resorted to, if reasonable skill is available to attempt the use of the great saphenous vein.

Despite these and many similar points calling for criticism, the book has several commendable features. Chief among these are, perhaps, the point of departure—the too-often neglected period of labour; the emphasis placed upon certain important concepts, such as the malign influence of upper respiratory infection and of measles upon the child community; and the prominence given to breast feeding.

PROGRESS IN NEUROLOGY.

AFTER an interval of six years the fourth edition of "Recent Advances in Neurology", has been published.[1] Originally written by W. R. Brain and E. B. Strauss in collaboration, it has been revised by the former author alone.

Many of the older chapters have been deleted and replaced by different material. Those retained have had new matter incorporated. What is unusual is that the new edition is considerably smaller than the old. The new chapters contain information on such matters as headache, the functions of the frontal lobes, electro-encephalography and vitamin deficiencies.

The book, though good in many respects, is of uneven quality, and no uniform system seems to have been followed in discussions on the subject matter. Thus an excellent chapter may appear in which what may justly be claimed as recent advances is discussed in relation to the older knowledge; yet in another material may have been covered from one or two recent articles without reference to older publications which contain as much or more information. For instance, the discussion on torulosis refers solely to one recent English paper, and no mention is made of the informative and important monographs. The discussion on herniated intervertebral disk as a cause of sciatica, although of practical importance, is compressed within one page, and does not refer to the role of the *ligamentum flavum*. Two English authors form the bibliography. The unimportant subject of gargoylism is given two pages. It is also a little startling to find the bibliography of the hypothalamus containing no reference to Ranson. In the discussion on intracranial tumours the astrocytomata are dismissed with nine lines. This gives no idea of the important and practical differences of type of these common tumours.

The material is as a rule clearly presented and of good quality, although lacking evidence of a wide research into the available literature. Some statements require qualification. In writing of the use of encephalography in determining the type of hydrocephalus, the author states that if air passes into the ventricles the hydrocephalus is of the communicating type. This statement, although generally true, does not apply when the internal block is intermittent. When obstruction of one or both foramina of Monro is suspected, and when a dye injected into one ventricle can be recovered from the other, it is stated that the foramina of Monro are patent. This does not take into account the perforations of the *septum pellucidum* which so frequently occur with colloidal cysts of the third ventricle.

This book will probably be of most use to the practitioner who is embarking on post-graduate studies. He will find it of real value, although even for him it could be much improved. Except for a few chapters, it will be of little value to the practising neurologist.

[1] "Recent Advances in Neurology", by W. R. Brain, D.M., F.R.C.P.; Fourth Edition; 1940. London: J. and A. Churchill Limited. Demy 8vo, pp. 373, with illustrations. Price: 15s. net.

ASTHMA IN GENERAL PRACTICE.

"ASTHMA AND THE GENERAL PRACTITIONER", by James Adam, is written in a very dogmatic way.[1] It is based on the study of two thousand cases of asthma, and it seems that these have been handled easily and successfully by the author.

Of asthmatic people 50% are not allergic. But in all cases of asthma "nurture" or nourishment is the most important factor to consider. Bad nurture produces toxicity, and attention to this factor by the author's methods will produce success when allergist's methods fail. The methods outlined are general hygienic measures, of which a weekly blue pill stands out preeminently and acts as a charm.

Urban life and increased carbohydrate consumption have much to do with the increase of asthma; hence a Spartan life is urged for the sufferer, and raw milk, which acts as a poison, is forbidden.

Allergy is summed up as a reaction to protein dirt of endogenous or exogenous origin.

The book is simply written but contains nothing new. Its value lies in its brevity, its statement of general hygienic principles and its warning against too vigorous surgical measures on the nasal passages of the patient with asthma.

ANO-RECTAL DISEASES.

"PROCTOLOGY FOR THE GENERAL PRACTITIONER", by Frederick C. Smith, is designed to meet the needs of the general practitioner and can be recommended as a valuable contribution dealing with ano-rectal conditions, and offering clear and concise methods of diagnosis and treatment.[2]

Dr. Smith professes to be interested in proctology, but the book covers a wide and useful field and deals with such conditions as pilonidal sinus, flatulence, the various forms of diarrhœa, constipation and intestinal parasites.

The work is attractively put together and is profusely illustrated with black and white and coloured drawings. The chapter dealing with intestinal parasites is of particular interest. Controversial subjects are omitted.

One of the most valuable sections is that dealing with symptoms of ano-rectal conditions. Instruments are fully described. The operative and non-operative treatment of piles are discussed, and many sclerosing fluids for the latter are suggested. A chapter is devoted to colonic surgery, and finally a list of recipes for nutrient enemata rounds off a very useful work.

[1] "Asthma and the General Practitioner", by J. Adam, M.A., M.D., F.R.F.P.S.G., with a foreword by J. Bridie, M.D.; 1939. London: Baillière, Tindall and Cox. Demy 8vo, pp. 168. Price: 6s. net.

[2] "Proctology for the General Practitioner", by F. C. Smith, M.D., M.Sc., F.A.P.S.; 1939. Philadelphia: F. A. Davis Company. Medium 8vo, pp. 390, with 142 illustrations and 3 coloured plates. Price: $4.50 net.

The Medical Journal of Australia

SATURDAY, MAY 25, 1940.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

THE REHABILITATION OF PROSTITUTES.

In a recent issue we discussed a League of Nations publication on prostitutes and their early lives. This report was issued by an advisory committee that set out to inquire into measures for the rehabilitation of prostitutes. The conclusion of our previous discussion was that society has a right to consider the rehabilitation of prostitutes only when it refuses to tolerate conditions that lead to vice and when it is making an attempt to deal with the preventible factors of prostitution. Emphasis was also laid on the fact that the primary cause of prostitution is the demand for prostitutes, all other causes being secondary. In a discussion on rehabilitation the same general conclusion must be reached, and it may as well be stated first as last: whatever success may attend attempts at rehabilitation, remedial measures can never be the best treatment; prevention alone offers a permanent solution to this important problem.

By the rehabilitation of prostitutes is meant the process of helping women to abandon prostitution and to reenter the normal working life of the community. In the latest of the reports of the Advisory Committee on Social Questions of the League of Nations, to which we now draw attention,[1] it is pointed out that the definition just given will not be universally accepted, because it is the avowed aim of some of the religious homes that the women assisted by them shall never return to the life of the world. Rehabilitation of this kind is worth while if it leads to self-respect and to the happiness and contentment of the individual; but it is obviously incomplete. At the outset of an inquiry into this subject it may be asked whether it is possible for women to leave a life of prostitution and to resume a normal life. The reply is: "Yes, but not always." Permanent readjustment can and does take place, and in countries whose customs and social standards are widely divergent. It has been stated that the chief difficulty in the way of readjustment lies in the woman's own attitude and moral standard. Unless her mentality is grossly subnormal her mental attitude can be altered by outside influences. The League of Nations report shows that readjustment is more likely to occur when the woman has not been leading a life of prostitution for very long and when she is relatively young. There is no doubt that the abolition of regulated prostitution in many countries and the more tolerant attitude of society have increased the number of prostitutes able to rehabilitate themselves by their own efforts. Clearly, then, the efforts of an enlightened society to promote rehabilitation are well worth while. One of the greatest difficulties to be faced by a prostitute who is trying to change her way of living is the stigma that is likely to remain with her. In most countries society generally is more tolerant and more broadminded than it was, but the I-am-holier-than-thou attitude is still too common and people are too ready to forget the story of the woman of whom it was said: "He that is without sin among you, let him first cast a stone at her."

The committee issuing the report under discussion collected information by means of a *questionnaire*,

[1] "League of Nations Publications. Enquiry into Measures of Rehabilitation of Prostitutes, Part III and Part IV: Methods of Rehabilitation of Adult Prostitutes; Conclusions and Recommendations"; 1939. Geneva: League of Nations Publications Department; Australia: H. A. Goddard. Demy 8vo, pp. 157. Price: 3s. 6d. net.

and it draws conclusions and makes certain recommendations. At the outset we have the discouraging statement that there are no facts to warrant the hope that measures of rehabilitation by themselves will ever greatly diminish the number of prostitutes. None the less, agencies and homes for rehabilitation are necessary and useful. Since climate, social structure, religion, custom and natural temperament affect the character of prostitution and the prostitutes, no one method of rehabilitation can be regarded as the best in all circumstances. "It is useless to train prostitutes in institutions if social custom, bad labour conditions, the unhampered activities of brothel-keepers and procurers and the absence of insurance against unemployment and ill-health will throw them back into prostitution when they leave." As already indicated, for the word "useless" in the foregoing sentence we would substitute "unjustifiable". The committee further concludes that the difficulties of rehabilitation will remain great so long as the demand for prostitutes enables women to earn far more in prostitution than in other work. Several of the committee's recommendations are important. Since young and what may be called early prostitutes are more likely to be helped, means of assistance should be made known and "offered early". The combination of social service with medical treatment for venereal disease provides an opportunity for the assistance of these women. Methods of rehabilitation treatment should be elastic and planned to suit the individual. Most women who have been professional prostitutes for some years can regain health and the habit of work only by spending some time, perhaps a year or two, in an institution. Social service bureaux should be connected with such institutions and there should also be hostels where women can lodge when they go out to work. Obviously the attributes of the workers in these institutions must be of the highest order, as must their knowledge. Further details regarding institutions of this type need not be discussed. The final conclusion of the committee is that if it were to become the common practice of prostitutes appearing before the courts for some offence against the law to be examined by a mental specialist, and if a period of supervision or training were to take the place of fines and short terms of imprisonment, the activity and importance of rehabilitation organizations would increase.

Before this short discussion is closed reference must be made to the two great disadvantages under which measures of rehabilitation are carried on: the reluctance of prostitutes to submit to treatment, and the cardinal fact that rehabilitation can only reduce the supply of prostitutes and not the demand for them. In Australia the professional prostitute is not so great a menace as her amateur sister, and health authorities bear witness to the truth of this statement. In spite of this, something more can be done and should be done than is being at present attempted to cope with conditions, particularly in the economic world, that lead to prostitution. This is a matter for the legislature; but legislators will not move until public opinion is aroused; it thus becomes the duty of the enlightened members of the community to awaken the public conscience.

Current Comment.

YOUNG-DAH-HTE.

THE people of primitive races are peculiarly liable to strange hysterical paroxysms, even when they have been in contact with civilization for many generations. A notable instance of this is the wild manifestation of religious fervour exhibited by the American negro. *Latah*, in Malaya, *myriachit* in eastern Siberia, *schamanismus* in Borneo, and *banga* in the Belgian Congo, all seem to be hysterical disorders. *Amok*, in which the affected person becomes violent and murderous, is sometimes a manifestation of delirium due to high pyrexia. The affliction of Beard's "jumping Frenchmen of Maine", impulsive tic (Gilles de la Tourette's disease) and various "jumps", "barks" and "jerks" described from time to time in Europe resemble *latah* and allied conditions. A similar malady, which seems to have escaped mention in text-books on medicine, occurs in Burma and is known as *young-dah-hte* (literally "to be ticklish and nervous"). It has recently been described by R. M. Lloyd Still.[1] "The condition is characterized by paroxysms of apparently purposive actions which occur independently of the will as a result of a given stimulus." Still has recognized two types of the disorder. A sufferer from the first type

[1] *The Indian Medical Gazette*, February, 1940.

reacts to sudden stimuli by imitating words, gestures and actions of persons close to him; he may utter an obscene epithet at the same time. In response to a sudden tactile or auditory stimulus the sufferer from the second type of *young-dah-hte* jumps and recoils as though he had been greatly frightened; at the same time he utters an obscene or unintelligible epithet. It is stated that in every village there are one or two afflicted persons. The sufferers are not looked upon as sick people by their fellows, and are generally regarded as harmless. In *latah* the patient is apparently quite normal until he is thrown into a state of *latah* by a sudden stimulus. In this respect he differs from the sufferer from *young-dah-hte,* who is always in the condition. Still remarks that these people appear to possess average mental development, but have only a feeble control over the lower centres. He stresses the medico-legal importance of the condition. One of his patients was about to spend a night at a rest-house; a servant dropped a block of wood (to be used as a pillow) on the ground a few feet from him; he thereupon seized the block of wood and hurled it at the servant, killing him. "If a crime is committed by such a sufferer, the fault and punishment should not fall on him, . . . and in some cases the individual who made the suggestion might have to be considered the guilty party." An interesting feature is that the people most liable to these strange disorders are of Mongolian stock. As Castellani points out, the Madagascans, among whom there was an outbreak of dancing mania in 1863, have a strong admixture of Malayan blood.

GEORGE BODINGTON AND THE SANATORIUM.

In an article published elsewhere in this issue we are reminded of the centenary, which falls this year, of the enunciation by George Bodington of the basic principles of the modern treatment of pulmonary tuberculosis. Medicine is ever ready to make generous amends, though only too often posthumously, to those of her servants whose scientific achievements she has recognized tardily and perhaps rewarded not at all. When fame comes to the man of medicine through his achievements there is a general desire to know more of him, more of his life and work. No biography of Bodington has hitherto been published, except in the contemporary notices of his death. Dr. Anderson has contented himself with sketching the highlights of Bodington's career, while collecting in one place for the first time a fairly complete bibliography, which should aid the pious student or biographer of the future.

Bodington, not only in his advocacy in the face of much prejudice of a "natural and rational" treatment of consumption, but in his bold denunciation of the orthodox methods of treating cholera and scarlatina, is shown to have been a man wise in advance of his generation. It is true that famous men before him had recognized the advantages of the open-air life: Celsus recommended a long sea voyage to Egypt, and Sydenham said that there was no treatment so good as horse-riding. But Bodington is truly the father of the open-air treatment of phthisis as it is practised today. He showed the way; but he did not lead the way, for he had no following; and thus achievement brought him, as to many another, only bitterness.

It may be thought that Dr. Anderson draws a fine distinction when he denies that Bodington's house was a sanatorium and denies the sanatorium a share in the centenary. It is timely, however, to distinguish sharply between the sanatorium, which is "only a place", and Bodington's principles of treatment, which are often practised at such places and which every consumptive needs at some time in addition to and as the background of any special treatment suited to his disease. There is no magic in the word "sanatorium"; but how many consumptives are sent away full of hope to places called sanatoria, where they acquire a thin veneer of robustness or languish without a sufficiency of the expert medical or surgical care of which they are really in need! We have published recently an article by Dr. A. H. Penington and a letter from Dr. Cotter Harvey, setting out the present position and probable place in the future of the sanatorium in the treatment of tuberculosis. Dr. Penington points out that some of the best modern sanatoria in other countries combine, as he puts it, the characteristics of a sanatorium and a "chest hospital", being fully equipped medically, pathologically, radiologically and surgically, as well as providing suitable accommodation, occupation and training during the long period that is necessary to convert the consumptive, whose disease can be staved off, from a liability into an asset to the community. Dr. Penington would hence discard the term "sanatorium" altogether for one which describes the modern institution more comprehensively. Dr. Harvey doubts the practicability in this country of bringing every phase of phthisiology from diagnosis to rehabilitation within the ambit of a single institution. He feels strongly that every State in Australia should maintain a special chest hospital as an essential part of the succour it provides for the tuberculous. We agree with him when he writes:

> The bed shortage for tuberculosis in every State is disgraceful; the urgent need is obvious. Let the sanatoria remain in the country; modernize them by all means—most of them need it badly. But let us concentrate on establishing in every capital city—Adelaide has already shown the way—a first class hospital . . .

Modern medicine has few more striking or gratifying advances to show than in the diagnosis and surgical treatment of pulmonary tuberculosis, and there is no doubt that in this country these are not yet promptly available to all who stand in urgent need of them. But, after all, hospital and sanatorium achieve their triumphs by the aid they bring to the *vis medicatrix naturæ*; and the consumptives' sheet anchor is still the "natural and rational" treatment which is now just one hundred years old.

Abstracts from Current Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Sulphanilamide in Experimental Malaria.

L. T. COGGESHALL (*Journal of Experimental Medicine*, January, 1940) has noted the selective action of sulphanilamide on the parasites of experimental malaria in monkeys *in vivo* and *in vitro*. With as small a dose as 1·0 gramme by mouth cure could be obtained in an animal infected with the usually lethal *Plasmodium knowlesi*, while little or no effect was observed on animals infected with *Plasmodium inoui*. Animals were treated with the drug after single infections and after mixed infections with the two parasites, and the truth of the observation was established, one infection disappearing and the other remaining. Thus the difference in behaviour of the two parasites did not appear to be due to a difference in the host. Attempts were made to test the effect of the drug *in vitro*, and the striking observation was made that when the oxygen consumption of the two strains was tested in a Warburg manometer, the susceptible strain, *Plasmodium knowlesi*, consumed nearly six times as much oxygen as the resistant one, *Plasmodium inoui*. The addition of sulphanilamide to the fluid in which the parasites were suspended almost completely interfered with the metabolism of *Plasmodium knowlesi*, while *Plasmodium inoui* was little affected. The author concludes that the experiments indicate the necessity of taking into consideration the metabolism of the parasites themselves when the effectiveness of any antimalarial drug is being tested.

Antibodies in the Skin.

GEORGE HARTLEY, JUNIOR (*Journal of Infectious Diseases*, February, 1940), describes experiments that he has devised to test the possible formation of antivaccinial antibodies in the skin. His problem was to localize the antigen in areas of inoculation without increased vascularity, where the collection of large numbers of macrophage cells had previously been stimulated. He found that the intradermal injection of an aluminium hydroxide gel in amounts of three cubic centimetres produced nodules after 18 to 21 days, in which there were large numbers of macrophage cells whose activity against indian ink particles he demonstrated by section and staining. Then small amounts of vaccinia virus were adsorbed to further hydroxide gel, and amounts of 0·04 cubic centimetre were injected into the nodules. Various tissues, blood serum, inoculated areas and normal skin were removed four days later, and experiments made with these to determine the presence of virus, and also the presence of antibodies to the virus. The virus was present in the nodules after four days but not after nine days. It could not be found in the liver, spleen or bone marrow after nine days. It was not recovered from the whole blood. The tissue extract from the vaccinated nodules consistently exhibited three times as great neutralizing activity against virus as the non-vaccinated skin or extracts of liver, spleen or bone marrow. In control animals, the gel virus mixture having been injected into normal skin, the antibodies were present in higher concentration in the blood stream than in the areas of inoculation. A final experiment, in which an animal with nodules was given intravenous injections of virus, showed that the organs had a higher antibody content than the nodule, thus indicating that the antibodies were not concentrated in the nodules from the blood stream. The author believes that his experiments have demonstrated the local formation of antibodies in the presence of adsorbed virus and numbers of large phagocytes. He feels that the control experiments prove that the antibodies have not been brought to the site of the nodules, and that the large phagocytes are responsible for the production of the antibodies.

Brucella in Lymph Nodes.

MARY A. POSTON AND PHILIP B. PARSONS (*Journal of Infectious Diseases*, January and February, 1940) describe in detail the method by which they had been successful in cultivating *Brucella* from lymph nodes showing the pathological picture of Hodgkin's disease. The success of the method depended upon adequate amounts of moisture and an acid reaction in an atmosphere of carbon dioxide, and the cultures were maintained by frequent transplants. *Brucella melitensis suis* was isolated from seven cases and *Brucella melitensis melitensis* from three cases. Cultures from three patients with chronic brucellosis without evidence suggesting Hodgkin's disease were also obtained. Cultures were made from 67 lymph glands obtained at biopsy for other purposes, and in only one was there a growth of *Bacillus melitensis suis*.

Pathogenicity of Bacterium Alkalescens.

DAVID NABARRO AND DERRICK EDWARD (*Journal of Pathology and Bacteriology*, November, 1939) state that they had their attention drawn to the increasing incidence of a dysentery-like organism in cultures from the intestine by the occurrence of a case-to-case infection in a ward. Agglutinins were found in the patients' blood, which reacted to the stock culture of *Bacterium alkalescens* from the National Collection of Type Cultures, and an antiserum prepared against this culture agglutinated the patients' strain. The authors collected 17 instances of disease in which this organism was recovered, the patients suffering from diarrhœa of either acute or chronic course, and in several instances the organism was also recovered from the blood and urine. The agglutination titre of the culture against the specific antiserum was usually moderately high, while the cultures also were slightly agglutinated by certain strains of *Bacterium flexneri* antiserum; this suggested that the organism had elements in its antigenic composition similar to those of the dysentery group. The authors believe that, contrary to the experience of several writers, there is a considerable amount of evidence that the organism is a pathogen and can produce a mild form of dysentery, which might be followed by the carrier state fairly easily, owing to the mildness of the attack. For this reason they feel that the organism is deserving of more study.

A Reaction between Clostridium Welchii Toxin and Human Serum.

F. P. O. NAGLER (*The British Journal of Experimental Pathology*, December, 1939) states that he has noted a change in the appearance of human serum that was being used for the culture of *Clostridium welchii*. After sixteen hours' inoculation under anaerobic conditions the serum became turbid and a fatty layer rose to the top, while the bacilli remained at the bottom of the tube. He investigated the change by experiments *in vitro*, and established that it was due to the presence of toxin. He found that the presence of antitoxic serum would inhibit or prevent the appearance of the change while not preventing the growth of the organisms. It was found that there was a definite minimum amount of toxin below which the change did not appear, and thus the phenomenon could be used as the end point in titration experiments on the amount of toxin or antitoxin present in a given sample of serum. Experiments on mice were carried out to confirm the accuracy of the test. The author established that any strain of *Clostridium welchii* would produce the appearance, and in each case dried antitoxin from Type A *Clostridium welchii* would inhibit the reaction. Many different sera besides human were tried. While monkey serum gave a slight reaction, none of the other sera were effective. The author states that he has not seen the reaction described before.

Isolation of Pneumococci.

W. J. AUGER (*The British Journal of Experimental Pathology*, December, 1939) describes a new method of culturing sputum on solid media by the use of carbon dioxide for the isolation of pneumococci. The sputum is care-

fully collected and washed in saline solution, and a particle not more than two millimetres in diameter is selected and spread on a plate of 2% agar medium, with human or sheep blood added. The lid of the Petri dish is lined with wetted sterile blotting paper and placed in the bottom of a large tin, and about 100 cubic centimetres of carbon dioxide are passed under the partially opened lid from a commercial cylinder of the gas to the bottom of the tin, the aim being to establish a concentration of about 0·25% to 0·5%. The lid of the tin is then sealed and the whole incubated at 37° C. for fifteen hours. Illustrations show greater growth and greater size of colonies on the plates treated with carbon dioxide. The author discusses the limitations of the mouse inoculation method for the isolation of pneumococci, and emphasizes the advantage and simplicity of the carbon dioxide method for routine work.

HYGIENE.

Tuberculosis in Medical Students and Young Physicians.

H. W. HETHERINGTON AND HAROLD L. ISRAEL (*The American Journal of Hygiene*, March, 1940) record the results of their observation of 400 medical students of the University of Pennsylvania, and the same people as graduates over a period of six to eight years after graduation. Tuberculous infiltration of the lungs, in most instances asymptomatic, was found in almost 18%. The authors state that the rate of death from tuberculosis among physicians is low. Of the 71 affected, four had already undertaken sanatorium treatment, 56 showed no symptoms or signs of the disease, and in 11 slight symptoms or signs were noted, though they appeared in good health. At graduation 64 were in good health. The X-ray appearances were classified into three grades, according to the density, character and extent of the shadows, grade III having the characters of moderately advanced tuberculosis. Persons belonging to grade I (29) received no treatment and none developed clinical tuberculosis. Of the eight grade II patients, one developed clinical disease after graduation. Restriction of activities, increase of rest and repeated X-ray examination were advised. In the 19 cases of grade III without symptoms similar advice was given. Eight developed clinical illness, three before graduation, and the sputum of six came to contain tubercle bacilli. Of the eleven (grades II and III) who showed slight signs and symptoms, two developed clinical disease (both without tubercle bacilli in the sputum). For these sanatorium treatment was advised. Several spent the summer vacation in bed. The value of treatment of such patients, not clinically ill, was clear. Of the 325 students who were free of evidence of tuberculosis on X-ray examination before graduation, three developed clinical tuberculosis (about 1%). Of the 400 graduates, nine had died, one from pulmonary tuberculosis; 15 (3·75%) out of 393 whose records were obtained developed ill health and clinical symptoms. At the same time a number of those who were apparently free of tuberculosis in their student days were found to be infected after graduation. Only 16 of the 400 failed to react to tuberculin, and three of these developed tuberculous lesions. The early years after graduation are most dangerous. Eight of the 15 who developed clinical tuberculosis did so in their period of residence at a hospital.

Tuberculosis among Massachusetts School Children.

E. P. HUTCHINSON AND ALTON S. POPE (*The American Journal of Hygiene*, March, 1940) record the results of testing 117,000 school children in Massachusetts for tuberculosis. At first, children in three categories were selected: children 10% or more below standard weight, contacts of a home case of tuberculosis, and children in poor health frequently away from school. A von Pirquet scratch test was followed by X-ray examination of the reactors or any with suspicious signs. Later, all children were included. The test proved a reliable screen for detection of active tuberculosis in mass surveys. Reaction rates showed an equal incidence of infection in the two sexes, independent of age or locality. The increase with age was pronounced, amounting to about 3% per year, the lowest figure being found in townships with a population of less than 2,500.

Prevention of Venereal Disease after Exposure to Infection.

H. D. L. SPENCE (*The Lancet*, December 30, 1939) gives to an adult of average weight a total of 1·8 grammes of neoarsphenamine, divided into three doses, administered on the first, second and fourth days, when exposure to infection with syphilis has recently occurred. For irrigation of the anterior urethra in prophylaxis against gonorrhœa he thinks that potassium permanganate solutions are "rather irritating", and uses silver proteinate instead.

The Adult of Microfilaria Malayi.

S. SUNDAR RAO AND P. A. MAPLESTONE (*The Indian Medical Gazette*, March, 1940) describe the appearances of the parent worm of *Microfilaria malayi*. They point out that no description of this worm has hitherto been made. A patient, whose peripheral blood contained *Microfilaria malayi*, had a cyst of the right forearm. The fluid aspirated from the cyst contained four adult worms and numerous *Microfilariæ malayi*. Neither the blood nor the lymph from the cyst contained *Microfilaria bancrofti*. The four worms were alive. Their movements were more sluggish than those of *Wuchereria bancrofti*, which has an active screw-like movement and is able to live for several hours outside the human host. The worms removed from the cyst died in about half an hour. In general appearance they are like *Wuchereria bancrofti*. The head is rounded; the mouth has no lips; there are "two rows of tiny papillæ running round the head". The tail in the male is curved spirally, as in *Wuchereria bancrofti*. The female's tail "tapers to a bluntly rounded tip". "The cuticle is smooth and without any transverse striations." One female worm measured 55 millimetres by 0·16 millimetre. The male measures 22 to 23 millimetres by 0·088 millimetre. After further description the authors state that they can distinguish no difference between the female worm and the female of *Wuchereria bancrofti*. They are able to distinguish slight differences between the tail papillæ and spicules of the male and of the male of *Wuchereria bancrofti*. The spicules of the newly described worm are more delicate and lack the transverse corrugations seen on the stout portions of the spicules of *Wuchereria bancrofti*. The authors consider this evidence, together with the facts that the embryos are different and that *Microfilaria malayi* develops apparently exclusively in *Mansonioides annulifera*, warrants recognition of the worm as a separate species. They propose the name *Wuchereria malayi*.

Dust Fibrosis and Banti's Disease.

F. W. SIMSON AND A. S. STRACHAN (*Publications of the South African Institute for Medical Research*, Number 45, 1940) describe the results of the intravenous injection into rabbits of various kinds of dusts. Only the dusts containing free silica were found to be toxic, and the lesions produced by them were found in organs provided with a reticulo-endothelial system related to abundant sinusoidal tissue—spleen, liver, lymph glands and marrow. In the experiments with quartz dust the gross and microscopic morbid changes in the organs closely resembled those of Banti's disease in the human subject: there were enlargement of the spleen, cirrhosis of the liver with ascites and severe anæmia. In advanced cases of experimental cirrhosis multiple foci of epithelial differentiation were observed. Analogy is drawn with the multiple foci of origin of primary cancer of the liver.

Silicosis and Pneumonia.

A. J. VORWALD *et alii* (*The Journal of Industrial Hygiene and Toxicology*, February, 1940) have made animal experiments which appear to indicate that it is wrong to infer that because the silicotic lung is unusually susceptible to tuberculosis it may also be more vulnerable to pneumococcus infection.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held at the Medical Society Hall, East Melbourne, on March 6, 1940, DR. H. C. COLVILLE, the President, in the chair.

Oxygen Therapy.

PROFESSOR R. D. WRIGHT read a paper entitled "Oxygen Therapy" (see page 718).

DR. FRANK ROSS referred particularly to the suitability of oxygen and of "Carbogen" for use in general practice and in the private homes of patients rather than in hospitals. He said that Professor Wright's presentation of the subject was a blending of important points of academic interest with those that showed he had a sound clinical sense; there was little to add to what he had said, though Dr. Ross was satisfied that tolerably good results were obtained with the apparatus available, poor as it was.

Dr. Ross then said that patients with anoxæmia and cyanosis, without interference with respiratory excursion, constituted a group for whom oxygen was of value in treatment. "Carbogen" was indicated when an increasing depth of respiration was desired. As an example of the former group, Dr. Ross instanced myocardial failure with cyanosis, dyspnœa and other evidence of air hunger. In general practice it was useful to take cyanosis as a rough guide; it was usually impracticable to get a more scientific determination of the degree of anoxæmia. The use of oxygen and "Carbogen" in practice was facilitated by the good service of the firm which supplied them, and there was no difficulty about the delivery of the cylinder and selected apparatus at the home of the patient. Dr. Ross added that the tube and funnel method of administration was quite helpful to the patient, even though there might be only a 5% increase in concentration. The patients were frequently very ill and were not in a state to tolerate the application of face masks or other elaborate apparatus. Neither the patients nor the relatives were upset by the use of the tube and funnel method, and it was usual for the symptoms to be relieved; nasal catheters were not usually well tolerated. Patients suffering from chronic bronchitis, emphysema and asthma derived benefit, and those with pulmonary œdema could be made more comfortable by means of oxygen given by the tube and funnel method from a cylinder. In the treatment of chronic myocardial failure the oxygen tent could be used conveniently and satisfactorily.

Dr. Ross went on to say that he used "Carbogen" as a routine measure for all adult patients suffering from pneumonia. He usually gave it by the tent method; but the patients were troublesome and restless and did not stay in the tent for very long at a time. He used it to try to keep the patient's colour good, and that object could be frequently achieved by administering the "Carbogen" for five minutes out of every half-hour. He added that, as in his experience the patients were relieved of urgent and troublesome symptoms, he had formed the opinion that the procedure should be adopted more generally by practitioners as part of the routine treatment of pneumonia.

Dr. Ross also spoke of "Carbogen" therapy for the newly born "blue" babies, gas being delivered through a nasal catheter. He was sorry that the firms did not put up "Carbogen" compressed in small ampoules. When carbon dioxide was used sparingly he had not seen any trouble arise if it was administered through a catheter, the tip of which was only a short distance inside the nose; he believed that the treatment had helped a number of babies. He also expressed the opinion that it was useful as a routine measure to administer "Carbogen" to patients recovering from general anæsthesia, as he thought it diminished the risk of post-anæsthetic pneumonia. In conclusion Dr. Ross said that practitioners could afford to use oxygen and "Carbogen" freely when it was indicated, because of the excellence of the service by the firm that supplied them.

DR. J. L. FREW, after thanking Professor Wright for his address, said that oxygen therapy was used at the Royal Melbourne Hospital particularly for pneumonia and acute heart failure, and in association with anæsthetics. In pneumonia the indications for its use were cyanosis and extreme dyspnœa, when the respiratory rate exceeded 32 per minute and the pulse rate exceeded 120 per minute. Oxygen was administered in heart disease mostly for acute cardiac failure with cyanosis. They had attempted to give oxygen under increased pressure in pulmonary œdema, but had not found it satisfactory. In the acute emergencies associated with thyreotoxicosis with rapid pulse rate and dyspnœa they had had some remarkably prompt cures with oxygen therapy; those emergencies might arise after thyreoidectomy. Other conditions mentioned by Dr. Frew were ulcerative colitis and persistent insulin coma; they had had several apparent cures of ulcerative colitis following the use of oxygen administered rectally, but he still had to be convinced about it. In the treatment of schizophrenia insulin coma was at times terminated by oxygen therapy when no satisfactory response to the use of glucose had been obtained.

Dr. Frew then discussed modes of administration of oxygen. He considered that oxygen chambers were too expensive for Melbourne and that the tents available needed the addition of decontaminating systems and humidity controls. The commonest method in use at the Royal Melbourne Hospital was the nasal catheter. The catheter was introduced three inches into the nose and oxygen had to be sent through at the rate of 10 litres per minute to achieve the 50% concentration which was regarded as desirable. The catheter should be changed frequently and the nose needed to be sprayed with oil. In spite of the catheter's being stuck onto the face with plaster, it was prone to fall out of the nose. Dr. Frew had observed that the method was tolerated better when there were three or four openings in the catheter through which the oxygen could pass. He referred to the apparatus in which a metal piece was fitted to the forehead and held two tubes, the ends of which were inserted just inside the nostrils. He had not had much experience of its use, but it seemed likely to be well tolerated. He said that they had also used an apparatus similar to that described by J. A. Campbell (*The British Medical Journal*, Volume I, 1936, page 1245). This was a box-mask involving rebreathing, and it had been advocated as economical in the use of oxygen, as it required only two litres per minute. The apparatus had proved disappointing, however, as the patients would not tolerate it. Dr. Frew showed some "Cellophane" masks on wire frames which had been devised by Dr. Hicks, a resident medical officer at the Royal Melbourne Hospital. He said that the frames were light and fitted over the ears like spectacles, and that the "Cellophane" could be changed or disinfected readily and inexpensively. The capacity could be varied, but an average of 1,200 cubic centimetres was considered sufficient for the purpose. Though these simple masks were well tolerated, they had proved to be wasteful of oxygen. Dr. Frew remarked that in the humidifying of oxygen it was better to run it through cold water rather than the warm water usually employed. He mentioned that they had had one or two explosions through the careless use of a naked flame near the oxygen stream from a cylinder. He emphasized the importance of keeping the nasal catheter free from mucus and in the nostril, and said that the oxygen as it bubbled through the water should give the appearance of furious boiling to obtain the correct alveolar concentration. He also drew attention to the danger of sudden cessation of oxygen therapy; it should be cut off gradually and progressively.

SIR STANTON HICKS, Professor of Physiology at the University of Adelaide, expressed pleasure at having the opportunity to be present and to speak. He said that the ground had been covered so well that there was little he need add. In the earlier part of his address Professor Wright had referred to the effects of shallow breathing and to some of the sequelæ, so he though it might be of interest if he cited a case which illustrated some of the points that had been made.

A Repatriation Department patient, who had been wounded and had had severe shell-shock in 1917, had come under notice with a diagnosis of "D.A.H.". He had shown progressive deterioration and his capacity to work had fallen steadily when the incident Sir Stanton Hicks wished to describe occurred, early in 1939. The ex-soldier tried to catch a train and was in a state of considerable excitement over his inability to be supplied with a railway ticket in comfortable time to board the train. The agitation had set going the mechanism which prevented proper ventilation of his lungs; he was blowing off carbon dioxide and not getting oxygen until a state of akalosis was produced. He got his ticket and ran for the train; but he fell under the train and damaged his leg severely. Sir Stanton Hicks expressed the opinion that he fell under the train because he had a "black-out". He was taken to hospital in a bad state of shock; the leg was amputated under ether anæsthesia and all went well. Two days later it was decided to clean up the stump, and in an attempt to give him the best possible attention the house physician administered oxygen and nitrous oxide anæsthesia. The patient died just as the surgeon commenced to operate. Sir Stanton Hicks remarked that on consideration it had to be recognized that the patient was getting much more oxygen with the ether anæsthesia than with the nitrous oxide, and on the second occasion to get the necessary depth of anæsthesia he was pushed to the point where he could not oxygenate his blood because of cardiac insufficiency. The matter of anoxæmia had to be borne in mind in the administration of nitrous oxide gas, as deeper anæsthesia was obtained by progressive reduction of the partial pressure of the oxygen present.

DR. IVAN MAXWELL referred first to the use of the nasal catheter and the rate of the passage of oxygen through the wash-bottle. He said that it was an utterly futile procedure if it were possible readily to count the bubbles per minute; the partial pressure of oxygen would be increased by only about 1% and not at all in the alveolar air. On the other hand, if a blast was going through into the patient's nose, say up to six litres per minute, it became quite unpleasant for the nose and naso-pharynx. Dr. Ross had mentioned the use of an oxygen tent for five minutes every half-hour. That statement had reminded Dr. Maxwell of Professor Whitridge Davies's analogy of a person held under water; to allow the head to come up out of the water for a few minutes only every now and again would bring about the death of the victim. Dr. Maxwell remarked that the removal of the tent for ventilation need not take longer than a minute, and the flow of oxygen could be interrupted periodically for that purpose; it was not necessary to remove the tent for twenty-five minutes every half-hour.

At the conclusion of his address Professor Wright had appealed for funds to conduct clinical research at the teaching hospitals into the question of what should be done to improve oxygen therapy in the State, and in commending the appeal Dr. Maxwell felt sure that the tents at present in use could be developed into something which might be really useful in general practice. In conclusion, Dr. Maxwell said that asthmatic patients did not need oxygen to relieve the intense constriction of the bronchiolar muscles; the spasm yielded to adrenaline.

DR. R. DUNGAN mentioned the use of "Nembutal" or some similar sedative to quieten the patients while they became accustomed to the administration of oxygen.

DR. GEOFFREY KAYE said that he had been interested in the way the discussion had been opened by Professor Wright and in the points made by the succeeding speakers; the subject was of special interest to him as an anæsthetist. He felt that it would not be proper for him to allow what had been said about nitrous oxide anæsthesia to pass unchallenged; properly administered it was a very safe anæsthetic. It should be remembered that the exact mechanism of anæsthesia was not understood, nor was it known just what happened to the respiratory hormones; but there was no question that anæsthesia to be safe should be free of anoxæmia. If the anæsthetist was unable to avoid anoxæmia, ether should be the anæsthetic of his choice. Dr. Kaye added that it was not good practice to tell a patient to breathe up during the stage of induction of anæsthesia. He then referred to research work being carried out by Professor Waters, of Madison, on the question of the absorption of carbon dioxide in anæsthesia, and remarked that he (Dr. Kaye) felt that he was able to cope with the problem adequately under clinical conditions. He thought that at times injections of morphine were helpful in pneumonia; but he agreed that it was wise to have oxygen ready for administration if required. He was entirely in favour of using oxygen therapy after thyreoidectomy.

Speaking generally of oxygen therapy, Dr. Kaye expressed the opinion that the cardinal fault was delay in initiation; the signs of incipient anoxæmia should be recognized early, and oxygen therapy should be begun while the patient was in a state to feel the benefit of it and to learn to tolerate it. The catheter method was usually the most efficient, but masks were well worth a trial. The usual small tents were unsatisfactory; but Dr. Kaye doubted whether there was a large tent in Melbourne. Though he valued the business service of the firm supplying the gases, he felt strongly that it should be the members of the medical profession who decided on the suitability of appliances and modes of administration. Those who used "Carbogen" should look upon it as a respiratory stimulant in which the stimulation was obtained from the carbon dioxide present; "Carbogen", after all, was diluted carbon dioxide.

DR. H. C. COLVILLE, from the chair, expressed appreciation of the discussion and referred to the amicable relationship between the industrial firm supplying oxygen and "Carbogen" and the members of the medical profession. As an earnest of their desire to cooperate he drew attention to the fact that Professor Wright and the Medical Secretary of the Branch had that day received a letter from the manager of the medical department of the industrial firm seeking assistance in obtaining the views of the doctors on the value of the type of tent at present in use, and asking for scientific information about the tent atmosphere and the importance of taking care of the carbon dioxide and water vapour that accumulated. The President asked that any members able to assist in those matters should communicate with him or with Dr. Dickson in an effort to effect an improvement by cooperating with the company's technical advisers.

Dr. Colville said that Professor Wright had apologized for introducing material of an academic nature into the earlier part of his address; but he assured him that the members had a special need for academic guidance in the subject under discussion and that the apology was quite unnecessary. If ever there were any surplus funds Dr. Colville had no doubt that the project mentioned by Professor Wright would be one of the first to receive favourable consideration.

Professor Wright, in reply, suggested that the Branch treasury seemed to be in need of oxygen therapy, and congratulated the President on the politic way in which he had phrased his response. He went on to say that the clinical points he had missed had been made by other speakers. He entirely agreed with Dr. Kaye that "Carbogen" should not be used promiscuously. He thought that Dr. Ross's remarks indicated the need for insisting

on the importance of prompt, adequate and continuous oxygen therapy whenever that form of treatment was indicated.

A MEETING of the New South Wales Branch of the British Medical Association was held on April 18, 1940, at the Royal Alexandra Hospital for Children. The meeting took the form of a number of clinical demonstrations by members of the honorary staff of the hospital. Part of this report appeared in the issue of May 18, 1940.

Congenital Ptosis.

DR. N. M. GREGG showed two boys, aged respectively three years and four years, on whom he had operated for the relief of congenital ptosis. The operation performed consisted in transplantation of the middle third of the superior rectus muscle into the tarsal plate.

Convergent Strabismus.

Dr. Gregg also showed a boy, aged ten years, to illustrate the results of combined operative and orthoptic treatment for convergent strabismus. Two operations had been performed, one in 1936 on the left eye, and one in 1940 on the right eye. Orthoptic training was given before and after the second operation. The child at the time of the meeting was orthophoric and had full stereoscopic vision.

Dislocation of the Axis.

DR. P. L. HIPSLEY showed a boy, aged thirteen years, who had been limping for two months prior to his admission to hospital, on November 18, 1939, and who was found to have muscular wasting of the left arm and hand, present for one month. Scoliosis of the dorsal segment of the spine was also present. Examination of the reflexes revealed that the biceps reflex and the knee and ankle jerks were present on the right side and exaggerated on the left side. The plantar reflex was flexor in type on the right side and extensor on the left side. The left hand and fingers were numb. X-ray examination revealed dislocation of the axis. The child was treated with halter extension and later by skeletal traction on the neck, and improvement occurred. After six weeks an operation was performed and the axis was wired to the atlas. However, three weeks later the child became paralysed in all four limbs and respiratory paralysis also developed. He was placed in a mechanical respirator and traction to the neck was applied by means of calipers inserted into the skull. His condition improved very much, and a week later a bone-grafting operation was performed and a plaster cast was applied to the neck. His condition continued to improve.

Exomphalos Cured by Operation.

Dr. Hipsley also showed a boy, aged twelve years, on whom he had operated for exomphalos, with complete extrusion of the liver, spleen, stomach and intestines. The operation was performed a few hours after the child's birth, and the case was reported in THE MEDICAL JOURNAL OF AUSTRALIA of April 20, 1929. The child was at the time of the meeting strong and robust. The broad scar on his epigastrium was strong and caused him no disability or inconvenience.

Osteomyelitis of a Rib following Drainage of an Empyema Cavity in Infancy.

DR. H. G. HUMPHRIES showed a male baby, aged six months, who had been admitted to hospital on October 11, 1939, suffering from pneumonia of the lower lobe of the right lung of one week's duration. "M & B 693" was given; but a pleural effusion developed on October 12, from which a hæmolytic *Staphylococcus aureus* was recovered. The cavity was drained by rib resection on October 13. The child had an uninterrupted convalescence and was discharged from hospital on October 30.

The child was readmitted to hospital two weeks later with an abscess at the site of drainage of the empyema cavity; this was incised and healed satisfactorily. The same organism was grown from the pus as had been grown from the empyema cavity.

The abscess recurred in February, 1940, and an X-ray examination revealed osteomyelitis of the rib.

Fibrocystic Disease of the Left Os Calcis.

Dr. Humphries also showed a boy, aged four years, who had been admitted to hospital on August 1, 1937. He had been limping with the left leg for two months, and slight swelling of the heel had been present for that period. The foot had been caught in the wheel of a bicycle three months previously. Examination revealed wasting of the calf muscles of the left leg; the patient walked with a limp, but no swelling was detected over the heel.

An X-ray examination revealed necrosis of the whole of the posterior part of the calcaneus, with reactive changes in the adjacent bone. The appearances were suggestive of a low-grade infective lesion. The child's blood did not react to the Wassermann test. The von Pirquet test elicited a reaction.

At operation on August 20 a cyst of the left calcaneus was found; this was curetted and the wound was closed without drainage. The cyst contained gelatinous material. The patient was discharged from hospital wearing a walking plaster. X-ray films taken two years later revealed restoration of the normal architecture of the bone, but a precocious appearance of the epiphyseal centre.

Prevesical Sarcoma.

DR. J. W. S. LAIDLEY presented specimens obtained *post mortem* from a boy, aged six years. The child had been admitted to hospital on March 9, 1940, with a history of having fallen on a post on the previous day; he had since been doubled up with pain. The pain was worse on micturition, and he passed only small amounts of urine at a time. There was no history of constipation, anorexia, wasting or pain in the loin.

On examination the child was found to have a large, hard, semilunar mass in the hypogastrium, dull to percussion and extending up from the *symphysis pubis* for about three inches; general abdominal tenderness was present. A mass could be felt through the anterior wall of the rectum. The child passed about one or two ounces of urine on his admission to hospital; no blood could be seen macroscopically. Later his bladder was catheterized and only half an ounce of clear urine was obtained.

Abdominal section was performed and a large cyst containing blood clot, necrotic material and myxomatous tissue was encountered, from which tissue was removed for examination. The pathologist reported that this was sarcomatous in character.

The child contracted scarlet fever and the edge of the wound became very indurated; a sero-sanguineous discharge was encountered with the probe. Later a fungating growth was seen to be extended through the wound and deep X-ray therapy was considered. The child died on April 11; for one week before his death convulsions, twitching and mental deterioration were present.

At autopsy, performed by Dr. R. D. K. Reye two hours after death, the body was found to be extremely wasted; post-mortem rigidity had not developed. Slight bulging of the abdominal wall was present above the symphysis and an unhealed laparotomy incision was situated at its apex. The veins of the anterior abdominal wall were distended.

When the abdomen was opened, a large retroperitoneal pelvic mass was found extending upwards about three inches above the symphysis anteriorly, to the level of the twelfth thoracic vertebra posteriorly and reaching almost to the crest of the ilia laterally. At its apex above it was firmly fixed to the operation wound by infiltrating tumour tissue. The kidneys were increased in size and were black from congestion. This congestion was part of the

abdominal venous congestion, seen exteriorly on the abdominal wall, and within as a great dilatation and congestion of the whole of the inferior *vena cava* and its tributaries above the level at which it was compressed between the tumour mass and the vertebral column. The right kidney weighed 95 grammes and the left 100 grammes.

Section of each kidney revealed a narrow rim of congested cortex and medulla encircling a much dilated pelvis. The pelvic mucous membrane was hæmorrhagic and thickened, the urine contained was cloudy, and many small phosphatic calculi were present. Each ureter was dilated to several times its normal diameter; this dilatation could be traced to the pelvic brim, where pressure against bone due to the tumour had occurred. From this level the ureters were not discernible until they had been dissected from the posterior aspect of the capsule of the tumour in which they ran a tortuous course. Especially tortuous was the course of the right ureter as it was traced to the uretero-vesical junction, since the bladder was displaced from its mid-line position and had come to lie on the postero-lateral aspect of the tumour against the left ilium. No erosion of ureters had occurred, nor were they in contact with the myxomatous portion of the tumour.

The bladder contained a quantity of turbid urine. The trigone was congested. At the apex three pedunculated masses of pink myxomatous tissue protruded into the vesical cavity. The urethra was patent and was not involved by the tumour.

No abnormality was present in the proximal portions of the gastro-intestinal tract, except some increase of congestion. At the level of the terminal portion of the ileum, about three inches proximal to the caecum, a firm adhesion was found between this portion of the bowel and the sigmoid colon. The adherent edges were discolored, indurated and necrotic, and free communication was found to exist, short-circuiting the greater portion of the large intestine. The sigmoid colon contained large amounts of fæcal material and was fixed to the tumour. When this was traced downwards the rectum was found to be much compressed against the pelvic floor, and towards its termination necrosis of a portion of the wall had occurred. When this was examined it was found to be connected with the centre of the tumour, which was in reality a cavity lined by dark necrotic walls and in direct continuity with the operation wound above and the lumen of the rectum below.

The tumour weighed 630 grammes. It was easily delivered after its adherences to the neighbouring viscera had been separated, as it had not infiltrated any of the tissues forming the pelvic walls. The para-aortic chain of lymph glands was prominent, the glands being enlarged, firm, discrete and for the most part pale. The retro-peritoneal lymph glands in the region of the caecum were also enlarged and pale. The mesenteric lymph glands were normal.

The liver was not enlarged or congested; it weighed 640 grammes. The surface was normal in colour and consistency. No secondary deposits were apparent. The spleen weighed 68 grammes; it was normal in size and consistency. The Malpighian bodies were well defined. The pulp was congested, but there was no evidence of secondary deposits. The pancreas and adrenal glands were normal.

The thymus was normal in size and consistency. The lungs were pale and crepitant, with small streaks of carbon deposits in the lymphatics beneath the pleura. A firm, rubbery, hæmorrhagic nodule about the size of a walnut was present on the upper border of the lower lobe of the left lung. Section revealed a homogeneous dark red surface, which bulged at the edges. The lymph glands draining this area were enlarged and hæmorrhagic, and appeared to be infiltrated with tumour cells.

The brain was not examined. *Bacillus coli communis* was grown on cultures from the urine in the kidneys and from the necrotic portion of the tumour.

Ichthyosis.

DR. GEORGE NORRIE showed a girl, aged thirteen years, suffering from ichthyosis. She had been admitted to hospital on March 15, 1940, with a history of dryness of the skin since birth, worse lately. On examination the patient was seen to be a big girl; most of the skin of the trunk was peeling off in large patches, and the skin of the head and face was also slightly affected. The arms and legs were fairly free. She was then being treated with Hebra's ointment, applied twice a day, and was receiving mixed female gland tablets (Burroughs Wellcome and Company), one tablet twice a day.

Hirschsprung's Disease.

DR. F. C. ROGERS showed a male infant, aged eight months, suffering from Hirschsprung's disease. The baby had been first admitted to hospital at the age of three weeks with a provisional diagnosis of pyloric stenosis; he had a history of vomiting since birth, usually after feedings, though there were intervals of two or three days. The vomiting was sometimes projectile. The child was breast fed. Constipation was also present, and bowel lavage was required every third day.

On examination *per rectum* the internal sphincter was found to be tight. No pyloric waves were seen whilst the child was in hospital. He was discharged from hospital after two weeks, having gained eight ounces in weight, with a diagnosis of possible Hirschsprung's disease.

The child was readmitted to hospital at the age of five months. He had been quite well until six weeks prior to his admission, when he became feverish and the mother was unable to obtain a satisfactory action of his bowels. He also vomited once a day and was losing weight. On examination he was seen to be very emaciated; the abdomen was much distended and felt "doughy". Treatment was begun by means of daily bowel lavage and the administration of whole lactic acid milk feedings. He still vomited occasionally. Three months later the induction of spinal anæsthesia to the level of the sixth thoracic segment was tried, but no noticeable improvement in the child's condition was effected. However, he had gained one pound eight ounces in weight since his second admission to hospital.

Glandular Enlargement.

Dr. Rogers also showed a boy, aged three years, who had been admitted to hospital on March 27, 1940, with a history of intermittent right-sided abdominal pain of one month's duration. One week prior to his admission to hospital he complained of abdominal pain, which was still present. He was slightly feverish on the night before his admission, but there had been no vomiting. The bowels were well open.

On examination the child was seen to be well nourished; his temperature was 99·2° F. and his pulse rate was 100 per minute. His tongue was clean and there was no tenderness or rigidity in the abdomen. The right femoral glands were enlarged and an impetiginous sore was present on the right foot. The Mantoux test elicited a positive reaction. The femoral glands became very enlarged and at the same time the iliac glands became enlarged. By April 8 the iliac glands were no longer palpable and the swelling of the femoral glands had been gradually subsiding.

Tendon Transplantation.

DR. KEITH SMITH showed three patients to demonstrate the results of tendon transplantations about the foot for residual paralysis. He enumerated a list of conditions to be observed which were of importance in this class of work. Dr. Smith stated that he was a believer in early assisted movement after tendon transplantation in order to preserve the gliding mechanism, and all his patients were given gentle movement commencing a week after the operation. He stressed the importance of securing adequate contact of tendon to bone; tendon to periosteum or tendon to fibrous tissue was insecure and apt to stretch. Atraumatic handling of tendons was of

paramount importance, and they should not be delivered from their sheaths or exposed in any way until all was in readiness for their implantation.

Supraorbital Tumour.

DR. L. STANTON COOK showed a boy, aged four years, whose left eye had become prominent six months previously. The swelling had become more noticeable during the last two weeks. The child had intermittently suffered from headache. On examination the left eye was seen to be displaced downwards and forwards; the supraorbital margin was blunted, irregular and hard.

A blood count gave the following information. The erythrocytes numbered 3,260,000 per cubic millimetre and were microcytic; the hæmoglobin value was 60% (Sahli). The leucocytes numbered 7,100 per cubic millimetre and 55% were lymphocytes. Neither the Mantoux test nor the Wassermann test elicited a reaction. An X-ray examination revealed no lesion in the long bones or spine, but some destruction of the upper part of the left orbital margin, probably due to malignant disease.

Pseudohypertrophic Muscular Dystrophy.

DR. R. J. TAYLOR showed a healthy looking boy, aged eight years, who exhibited the classical deformities, rolling gait and method of rising of pseudohypertrophic muscular dystrophy. It was thought that he might be mentally backward; but he was not clumsy with his hands. He was not encouraged at school. He excreted in the urine in twenty-four hours an excessive amount (500 milligrammes) of creatine and a subnormal amount (200 milligrammes) of creatinine. He was receiving one-third of a grain of ephedrine three times a day, thirty grains of potassium chloride three times a day and half a drachm of wheat-germ oil twice a day.

Hydatid Cyst of the Liver.

Dr. Taylor also showed a boy, aged eight years, who was said to have "always had a big stomach". It had recently been noticed that his abdomen was lop-sided, being larger on the right side than on the left. He was said to be nauseated when travelling on trams; otherwise he had no symptoms. He had lived at Flemington, where his father trained sheep dogs. A large firm tumour could be felt in the right hypochondrium; it was continuous with the liver and extended for three inches below the costal margin. The spleen was not enlarged. An X-ray examination of the abdomen revealed an enormous hydatid cyst occupying the right lobe of the liver and causing gross enlargement. The lungs appeared to be unaffected. A blood count revealed that the leucocytes numbered 6,000 per cubic millimetre; 58% were neutrophile cells, 26% were lymphocytes, 6% were monocytes and 10% were eosinophile cells. The Casoni test elicited a positive direct reaction. The child's blood did not react to the Wassermann test.

Congenital Syphilis.

Dr. Taylor then showed a female infant, aged nine months, who had been admitted to hospital on March 2 for investigation. She had been ill and pale since birth and had not crawled; her head rolled. On examination the child was seen to have a large hydrocephalic head and a tendency to double *talipes equino-varus*. Examination of the chest revealed signs of chronic bronchitis. The cerebro-spinal fluid was normal. A blood count revealed 3,120,000 erythrocytes per cubic millimetre and a hæmoglobin value of 48% (Sahli); the leucocytes numbered 11,000 and 73% were neutrophile cells. The child was suffering from microcytic hyperchromic anæmia. The Wassermann test elicited a positive reaction. An X-ray examination revealed that the medulla of the long bones was increased and the cortex was thinned. The bones had a trabeculated appearance and there were pathological fractures of the upper ends of both tibiæ. There were numerous small circular defects in the frontal and parietal areas.

Pink Disease.

DR. D. G. R. VICKERY showed two children, aged respectively eleven years and thirteen months, who exhibited very well the features of pink disease. Dr. Vickery was treating them with preparations of vitamin *B*. He said that he was not yet convinced of its efficacy in all cases.

The Royal Australasian College of Physicians.

SECOND ANNUAL MEETING.

THE second annual meeting of the Royal Australasian College of Physicians was held in Melbourne on April 4, 5 and 6, 1940. The programme included a meeting of the Council, the annual general meeting and two scientific sessions held in the lecture hall of the Royal Australasian College of Surgeons.

The second annual ceremony of the College was held in the Wilson Hall of the University of Melbourne on Friday, April 5, and was attended by the Right Honourable R. G. Menzies, P.C., K.C., M.P., Prime Minister; the Honourable Sir Frederick Mann, K.C.M.G., Chief Justice of Victoria; the Honourable Sir John Harris, K.B.E., M.L.C., Victorian Minister for Public Health; Major-General R. M. Downes, C.M.G., V.D., Director-General of Medical Services; Mr. J. D. G. Medley, Vice-Chancellor of the University of Melbourne; Sir Hugh Devine and Sir Alan Newton, President and Vice-President respectively of the Royal Australasian College of Surgeons; and Councillor A. W. Coles, Lord Mayor of Melbourne. The President, Dr. S. V. Sewell, was in the chair, and with him on the dais were the following councillors: Sir Charles Bickerton Blackburn, Dr. C. T. Champion de Crespigny, Dr. S. O. Cowen, Dr. J. G. Hayden, Dr. Konrad Hiller, Dr. A. W. Holmes à Court, Dr. C. H. Kellaway, Dr. L. Scott Latham, Dr. C. G. McDonald, Dr. Alex. P. Murphy, Dr. H. J. Ritchie, Dr. M. D. Silberberg, Dr. S. A. Smith, Dr. A. H. Tebbutt and Dr. A. E. Rowden White.

Among the 1,000 guests present were members of the judiciary, members of Federal and State Parliaments, representatives of the university and of the consular corps, benefactors of the College and a larger number of distinguished guests and their wives.

The proceedings began with the entry in procession of the President and Council of the College and representatives of the Royal Australasian College of Surgeons and the University of Melbourne.

The Censor-in-Chief called upon the Chief Justice of Victoria, Sir Frederick Mann, to declare the meeting open.

In his address, Sir Frederick Mann said that the Royal Australasian College of Physicians, like its sister institution, the Royal Australasian College of Surgeons, was very young in years; but both institutions shared the advantage of being extremely well endowed in the character, attainment and experience of the men who controlled their respective functions. The colleges were thereby well equipped to fulfil their purpose—to provide machinery for the highest form of professional education not available by other means in the Commonwealth and New Zealand and to supply the coping stone to the learning which might be derived from the ordinary curricula of the various universities. A purpose of that kind was of the highest possible importance to the health of the community. In times of war, such as the present, with their attendant menace of epidemics, the work of such institutions was of particular importance. He supposed it was still true that the toll of life taken by disease in times of war was heavier than the loss occasioned by fighting. Research had been going on since the last war and great advances had been made. The

people of Australia and New Zealand would like to think that the physicians and surgeons of these southern Dominions were united with their brethren of the rest of the Empire in bringing to the contest their new learning.

The Censor-in-Chief presented to the President the following newly admitted Members of the College: Dr. C. B. Berryman, Dr. R. M. Biggins, Dr. R. T. Binns, Dr. C. R. B. Blackburn, Dr. C. R. D. Brothers, Dr. J. F. C. C. Cobley, Dr. J. H. Colebatch, Dr. K. McK. Doig, Dr. A. D. Gillies, Dr. Janet L. Greig, Dr. J. E. McGlashan, Dr. J. A. McLean, Dr. G. C. Middleton, Dr. H. W. F. Mitchell, Dr. Edward Rosanove, Dr. J. G. Sleeman, Dr. T. H. Steel, Dr. A. G. R. Uglow and Dr. G. R. West.

The President then presented the medal for the Margaret Ryan Scholarship in Medicine to Dr. W. Hamilton Smith, and the President of the Royal Australasian College of Surgeons presented the medal for the J. P. Ryan Scholarship in Surgery to Dr. J. B. Curtis and the Michael Ryan Scholarship in Surgery to Dr. J. R. McCoy.

The President of the College, Dr. S. V. Sewell, delivered an address entitled "The Development of a Medical School" (see page 713).

The Prime Minister, Mr. Menzies then addressed the audience, saying that he had watched with enormous interest the development and recognition of the two great Royal colleges in Australasia—the College of Surgeons and the College of Physicians. The establishment of those bodies was an enormous step forward in Australia. The idea of achieving democracy by reducing the level of social standards he believed was the greatest fallacy. It should be realized that democracy could continue only if it was constantly striving towards higher and higher standards in every branch of knowledge and every walk of life. Democracy, to his mind, was not the easy way of life. It was the hard way, and because of that he believed that the establishment of the Royal Australasian College of Physicians, with its inevitable raising of standards, was a magnificent contribution to the power of Australian democracy.

As a member of the public, continued Mr. Menzies, he honoured and envied the medical profession. In the life of the present generation tremendous advances had been made in science—it had been almost a golden age in that regard; yet in many branches of science people were driven to wonder whether the advances that had been made were worth while. In certain fields they had seen science used for the destruction of man and the ruin of things that were good; but in the realms of medicine and surgery there had been astonishing progress and they could look at it all with admiration and gratitude. For that reason the medical man was, he believed, essentially the best man. He was making a constructive, unambiguous contribution of the greatest possible value to the nation and to every one of its people.

The Minister of Health, Sir John Harris, on behalf of the Victorian Government, congratulated the medical profession on the establishment of its two colleges, which, he said, would result in the highest standard of ethics and knowledge.

The Director-General of Medical Services, Major-General R. M. Downes, said that many aspects of disease that would arise during the war would provide fertile fields for medical activity. There was no doubt that the Australian public would insist upon proper care of its troops when they were sick or wounded. There were at present 250 medical officers under canvas in Australia. In the last war 1,000 medical officers had left Australia, and as the population had increased by nearly one-third since the beginning of that war, there was little reason to expect that a lesser number would be required for the present war.

The meeting ended with the playing of the national anthem, and guests then adjourned to the Union House, where they were entertained at supper by Dr. A. E. Rowden White.

Post-Graduate Work.

WEEK-END COURSE IN MEDICINE.

THE New South Wales Post-Graduate Committee in Medicine will hold a course of instruction in medicine in the lecture hall at the Prince Henry Hospital, Little Bay, during the week-end July 27 and 28, 1940.

The programme is as follows:

Saturday, July 27.

9.15 a.m.—"Acute Glomerular Nephritis", Dr. A. J. Collins.
10.15 a.m.—"Disorders of Liver Function", Dr. C. G. McDonald.
11.15 a.m.—Morning tea.
11.30 a.m.—"Treatment of Pneumococcal Infections", Dr. A. W. Holmes à Court.
12.15 p.m.—"Some Aspects of Chronic Arthritis", Dr. S. A. Smith, Director of Post-Graduate Medicine.
1 p.m.—Luncheon.
2 p.m.—"Diabetic Coma", Dr. W. W. Ingram.
3 p.m.—"Thyreotoxicosis", Dr. G. C. Willcocks.
4 p.m.—Afternoon tea.
4.15 p.m.—"Digestive Disorders of Childhood and their Treatment", Dr. E. H. M. Stephen.

Sunday, July 28.

9.15 a.m.—"Brief Review of Pathology of Vascular Disease", Dr. F. B. Byrom, Director of Post-Graduate Pathology.
10.15 a.m.—"Substernal and Submammary Pain", Dr. Harold Ritchie.
11 a.m.—Morning tea.
11.15 a.m.—"The Immediate and After Treatment of Coronary Occlusion", Dr. S. A. Smith, Director of Post-Graduate Medicine.

The fee for this course will be one guinea. Applications for registration, which must be accompanied by a remittance for the amount of the fee, must be made to the Secretary, New South Wales Post-Graduate Committee in Medicine, the Prince Henry Hospital, Little Bay.

CLINICO-PATHOLOGICAL CONFERENCE AT THE PRINCE HENRY HOSPITAL, SYDNEY.

LIBRARY seminars and clinico-pathological conferences, arranged by the Directors of Medicine, Surgery and Pathology, are held each month at the Prince Henry Hospital, Little Bay. These meetings are held at 4.30 p.m. on the second and fourth Monday in the month, public holidays excluded.

In the meetings, which are of a quite informal nature, special attention is given to recent literature, and it is the aim of the directors to encourage free discussion on the selected subjects.

A cordial invitation to be present is extended to all medical practitioners.

The next clinico-pathological conference will be held on Monday, May 27, 1940, when the subject of discussion will be myxœdema.

Correspondence.

WASTE PAPER.

SIR: I have recently been in touch with the "paper" section of the Lord Mayor's Fund.

It appears that "anything that looks like paper" except "Cellophane" and grease-proof paper is urgently needed,

firstly to raise money, and secondly to keep up the supply of paper pulp for industry and thus employment.

It occurred to me that the medical profession could thus dispose of all old telephone books, journals, envelopes and discarded mail matter, as well as advertising circulars and booklets, cardboard boxes and wrappers, dead letters, used blotting paper and the thousand and one things with which we are inundated. The general impression is that newspapers only are requested. This is quite wrong, and I am sure that it only needs the attention of members to be drawn to this to ensure their cooperation. Each day mail matters could be packed into a large discarded envelope and arrangements made with the Lord Mayor's Fund to collect daily at each building in Macquarie Street where they are willing to provide a container. Suburban members could ring and a carter will call. It is a very simple thing to do—MW 1996.

The proceeds from paper sales are divided equally amongst a number of the largest public hospitals, and the Lord Mayor's Fund and the waste-paper baskets will help both hospital and war funds.

The paper should not be soiled by swabs or dressings. Thus will the intense advertising of the manufacturing chemists achieve some useful purpose.

Yours, etc.,

"PAPER."

Sydney,
May 6, 1940.

VICTORIAN BRANCH RULES.

SIR: There are two slight errors in my letter of April 16. Corrected, it should read: "only 29 voted in favour of the motion, nine against; thus the whole Branch, of several hundred members, was controlled and its finances materially altered by 38 members".

Yours, etc.,

PAUL G. DANE.

110, Collins Street,
Melbourne,
May 6, 1940.

A MILITARY MEDICAL SCHOOL.

SIR: I beg to make a suggestion that the time has arrived for the establishment of a permanent military medical officers' school of instruction. This could, I think, be attached to the Defence Department or to the post-graduate schools in the various States. Having had the opportunity of observing military and civil medical schools in Germany in recent years, I am of opinion that we have a great deal to learn from them. Although I have made personal appeals previously in relation to this matter, I sincerely hope that every consideration will be given to the establishment of such a school, in that it could be used not only in times of war, but also in times of severe epidemics. Although the curriculum may be extensive, to me there should be no practical difficulties in commencing with this work. Details will necessarily have to be worked out; but I think that the post-graduate schools are quite capable of dealing with these, and I feel certain will offer every cooperation to the Defence Department.

In this world of flux constructive action and thought, both for now and in the aftermath of war, is badly wanted. So let us make a beginning.

Yours, etc.,

"PREPARED."

Sydney,
May 11, 1940.

A LIST OF SPECIALISTS.

SIR: As a general practitioner I frequently have occasion to refer patients to specialists, and specialization is becoming more diverse. A classified list of specialists in Sydney would be very useful to me. Do many of your readers feel the need of such a list? It should be easy to prepare and distribute. As the "Medical Directory" is available for further particulars names alone should be sufficient.

What is the opinion of your readers?

Yours, etc.,

"SUBURBIA."

May 8, 1940.

SHORTAGE OF SULPHAPYRIDINE.

SIR: I feel that it is desirable to bring to the notice of the profession generally the fact that there is a grave shortage of supplies of "M & B 693" (sulphapyridine). Owing to shipping difficulties, it is unlikely that the shortage will be relieved in the near future. In order to conserve the existing stocks of "M & B 693" the following instruction has been issued to all military commands.

Memorandum Concerning the Choice of the Sulphonamide Derivative to be Employed in Different Infections.

Supplies of "M & B 693" (Syn. "Dagenan", sulphapyridine) are seriously curtailed and every care should be taken to observe strict economy in the use of this drug.

The use of "M & B 693" should accordingly be restricted to the treatment of the following conditions: pneumonia and pneumococcal infections; purulent meningitis, due to *N. meningitidis*, *M. pneumoniæ* &c.; gonorrhœa and its complications; staphylococcal septicæmia, proven by blood culture; cases of bacteriæmia, proved by culture, arising from septic wounds, endocarditis &c.; gas gangrene.

Sulphanilamide should be the drug of choice in the treatment of the following conditions: erysipelas and cellulitis; soft chancre; follicular tonsillitis and *otitis media*; pyelocystitis, whether due to *B. coli* or other organisms; wounds known to be infected with hæmolytic streptococci (acute phase); meningococcal carriers.

By voluntarily observing similar restrictions in prescribing "M & B 693", medical men in civil practice would do a public service by helping to ensure that this valuable drug may remain available for the treatment of those conditions in which its use is especially indicated.

Yours, etc.,

R. M. DOWNES,
Major-General,
Director-General Medical Services.

Army Headquarters,
Victoria Barracks,
Melbourne, S.C.1.
May 14, 1940.

THE AUSTRALIAN IMPERIAL FORCE AND ITS MEDICAL OFFICERS.

SIR: Your editorial, "The Australian Imperial Force and its Medical Officers", May 11, 1940, is timely. Should necessity arise, the medical profession as a whole will respond enthusiastically to the call for service overseas, if the problem is handled sympathetically and tactfully.

The qualifications for voluntary service in the Army Medical Corps, Australian Imperial Force, are primarily medical, not military. The standard of physical fitness required in many branches of the Army Medical Corps is not that of front-line fighting troops, and soldiers are entitled to the best medical and surgical treatment—only to be given by those possessing the necessary knowledge. The following constructive suggestions are put forward in the hope that they may be of help:

1. All must appreciate the difficulties confronting headquarters in rapidly building up an efficient medical service from civilians, and not over-estimate the importance of the individual.

2. Members of medical boards should be provided with properly furnished and equipped examination rooms, providing essential quietness and reasonable comfort, for those submitting themselves for examination and the examiners themselves.

3. Great care must be exercised lest the result of thorough clinical examination is subordinated to the findings of technical investigations; for example, blood pressure readings taken under unfavourable conditions, and a single X-ray film of the thorax, perhaps hurriedly taken by a technician in the absence of expert supervision. It is well known that the correct interpretation of such a film, in the absence of further investigation, may be impossible or present much difficulty even to the most expert radiologist and clinician with ample time at their disposal.

It is fortunate for the army that, so far, a cardiograph, X-ray investigation of the cerebrum, gall-bladder, gastro-intestinal and renal tracts have not been insisted on.

To sum up: the aim of medical examinations should be to ascertain if the candidate is fit, rather than to see if he is unfit.

Yours, etc.,

Sydney, May 14, 1940. "OBSERVER."

THE MEDICAL PROFESSION AND THE WAR.

SIR: In connexion with my recent letter on "The Medical Profession and the War" I wish to state that Dr. Sewell has explained personally in conversation that the proposal for fifteen months' service was meant to apply only to men who were over military age and who, under present regulations, were unable to give any service abroad.

This was not clear from the newspaper report, and I think it only fair to Dr. Sewell to publish this explanation.

Yours, etc.,

38, Lisson Grove, Hawthorn, E.2, Victoria. May 15, 1940. D. O. SHIELS.

The Royal Australasian College of Surgeons.

MEETING OF THE BOARD OF CENSORS.

THE next meeting of the Australian Board of Censors will be held at the College, Spring Street, Melbourne, probably in September, 1940. Candidates who desire to present themselves at this meeting should apply to the Censor-in-Chief for permission to do so, on or before June 30, 1940. The appropriate forms are available at the College, Spring Street, Melbourne, and at the offices of the various State Secretaries.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of *The Medical Act of* 1939, of Queensland, as duly qualified medical practitioners:

Courtney, Charles Arthur, L.L.Mid., R.C.P. and S. (Edinburgh), L.F.P. and S. (Glasgow), 1893, Palm Island.

Youngman, Norman Vincent, M.B., B.S., 1935 (Univ. Melbourne), Dean Street, Toowong, Brisbane, S.W.1.

Medical Prizes.

SIR CHARLES HASTINGS MEMORIAL PRIZE FOR 1940.

THE Sir Charles Hastings Memorial Prize for 1940 has been awarded to Dr. L. J. A. Parr, of Sydney, for his thesis "A Clinical Study of 360 Cases of Arthritis".

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Goldschlag, Frederick, M.D. (Vienna), 1922, M.D. (Lwów), 1923, 135, Macquarie Street, Sydney.

The undermentioned has applied for reelection as a member of the New South Wales Branch of the British Medical Association:

Alcorn, Robert Mandeville, Lic., Lic. Midwif., 1914, R.C.P. (Ireland), Lic., Lic. Midwif., 1914, R.C.S. (Ireland), Box 76, Peak Hill, New South Wales.

The undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Baird, Roy Fearon, M.R.C.S. (England), L.R.C.P. (London), 1897, Norfolk Island.

Black, Robert Hughes, M.B., B.S., 1939 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Deane-Butcher, William, M.B., B.S., 1938 (Univ. Sydney), No. 6, Coora Court, Meeks Street, Kingsford.

Gill, Peter Waring, M.B., B.S., 1939 (Univ. Sydney), Sydney Hospital, Sydney.

Marks, Harold Montague, M.B., B.S., 1938 (Univ. Sydney), c.o. H. D. Marks, Esq., 127, King Street, Sydney.

Priestley, John Henry, M.B., B.S., 1939 (Univ. Sydney), Canowindra.

The undermentioned has applied for election as a member of the Victorian Branch of the British Medical Association:

Winthrope, Leopold, M.D., 1938 (Naples), Manangatang.

Books Received.

AN INTRODUCTION TO BIOCHEMISTRY, by W. R. Fearon, M.A., Sc.D., M.B., F.I.C.; Second Edition; 1940. London: William Heinemann (Medical Books) Limited. Demy 8vo, pp. 485, with illustrations. Price: 17s. 6d. net.

TEXT-BOOK OF PUBLIC HEALTH (FORMERLY HOPE AND STALLYBRASS), by W. M. Frazer, O.B.E., M.D., Ch.B., M.Sc., D.P.H., and C. O. Stallybrass, M.D., Ch.B., D.P.H., M.R.C.S., L.R.C.P.; Tenth Edition, revised and enlarged; 1940. Edinburgh: E. and S. Livingstone. Demy 8vo, pp. 514, with illustrations. Price: 21s. net.

HYGIENE FOR NURSES, by J. Guy and G. J. I. Linklater; Fifth Edition; 1940. Edinburgh: E. and S. Livingstone. Crown 8vo, pp. 252, with illustrations. Price: 5s. net.

DISEASES OF THE DIGESTIVE SYSTEM: A TEXT-BOOK FOR STUDENTS AND PRACTITIONERS, by E. Rosenthal, M.D., with a preface by R. J. V. Pulvertaft, M.D., F.R.C.P.; 1940. London: Henry Kimpton. Crown 4to, pp. 406, with 234 illustrations, including 104 in colour, and 16 tables. Price: 42s. net.

ELEMENTARY PATHOLOGICAL HISTOLOGY, by W. G. Barnard, F.R.C.P.; Second Edition; 1940. London: H. K. Lewis and Company Limited. Crown 4to, pp. 80, with 181 illustrations. Price: 10s. net.

MEDICAL RESEARCH COUNCIL OF THE PRIVY COUNCIL. SPECIAL REPORT SERIES, No. 235: THE CHEMICAL COMPOSITION OF FOODS, by R. A. McCance and E. M. Widdowson; 1940. London: His Majesty's Stationery Office. Medium 8vo, pp. 150. Price: 4s. net.

Diary for the Month.

MAY 28.—New South Wales Branch, B.M.A.: Medical Politics Committee.
MAY 30.—South Australian Branch, B.M.A.: Branch—Listerian Oration.
MAY 30.—New South Wales Branch, B.M.A.: Branch.
MAY 31.—Tasmanian Branch, B.M.A.: Council.
JUNE 4.—New South Wales Branch, B.M.A.: Organization and Science Committee.
JUNE 5.—Western Australian Branch, B.M.A.: Council.
JUNE 5.—Victorian Branch, B.M.A.: Branch.
JUNE 6.—South Australian Branch, B.M.A.: Council.
JUNE 7.—Queensland Branch, B.M.A.: Branch—Joseph Bancroft Memorial Lecture.
JUNE 11.—Tasmanian Branch, B.M.A.: Branch.
JUNE 11.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
JUNE 14.—Queensland Branch, B.M.A.: Council.
JUNE 18.—New South Wales Branch, B.M.A.: Ethics Committee.
JUNE 19.—Western Australian Branch, B.M.A.: Branch.
JUNE 20.—New South Wales Branch, B.M.A.: Clinical meeting.
JUNE 25.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments.

Dr. P. Macarthur has been appointed Government Medical Officer at Lithgow, New South Wales.

* * *

Dr. W. I. North has been appointed Honorary Medical Officer at the Wallaroo Hospital, South Australia.

* * *

Dr. W. B. Ryan has been appointed Superintendent of the Mental Hospital at Sunbury, in accordance with the provisions of the *Lunacy Acts* of Victoria.

* * *

Dr. F. J. A. Pockley has been appointed Honorary Ophthalmic Surgeon to the Lidcombe State Hospital and Home, Lidcombe, New South Wales.

* * *

The undermentioned have been appointed Members of the Royal Adelaide Hospital Advisory Committee, under the provisions of the *Hospital Act*, 1934, of South Australia: Dr. F. S. Hone, Dr. C. T. C. de Crespigny, Dr. R. E. Magarey, Dr. I. B. Jose and Dr. G. A. Lendon.

* * *

The following appointments have been made at the Royal Adelaide Hospital, Adelaide, South Australia: Temporary Honorary Surgeon in charge of the Neuro-Surgical Clinic, Sir Henry Newland; Temporary Associate Deep X-Ray Therapist, Dr. B. S. Hanson; Temporary Honorary Assistant Surgeon to the Neuro-Surgical Clinic, Dr. J. E. Hughes.

* * *

The following honorary appointments have been made at the Royal Alexandra Hospital for Children, Camperdown, New South Wales: Temporary Relieving Assistant Physicians, Dr. N. C. Cunningham, Dr. M. L. Edwards; Temporary Relieving Assistant Surgeons, Dr. C. H. W. Lawes, Dr. E. S. Stuckey.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser", pages xiv-xvii.

AUSTIN HOSPITAL FOR CANCER AND CHRONIC DISEASES, HEIDELBERG, VICTORIA: Medical Officer.
ISLAND OF NAURU: Government Medical Officer.
PERTH HOSPITAL, PERTH, WESTERN AUSTRALIA: Resident Radiologist.
ROYAL ALEXANDRA HOSPITAL FOR CHILDREN, SYDNEY, NEW SOUTH WALES: Honorary Medical Officers.
ST. GEORGE DISTRICT HOSPITAL, KOGARAH, NEW SOUTH WALES: Resident Medical Officer.
THE ROYAL NORTH SHORE HOSPITAL OF SYDNEY, NEW SOUTH WALES: Honorary Officers.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	Associated Medical Services Limited. All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Federated Mutual Medical Benefit Society. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 178, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	Wiluna Hospital. All Contract Practice Appointments in Western Australia.

Editorial Notices.

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(*c*) Temporary Honorary Relieving Assistant Surgeons (two).

To meet the absence on leave of Drs. W. P. MacCallum and S. E. L. Stening, the following positions have been created:

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